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XXIV.—BURMESE LACQUER WARE AND BURMESE VARNISH.

(*Melanorrhoea usitata*, Wall.)*

(With Plates.)

The tree that affords the Burmese Varnish is a large deciduous species met with in the open forests of Manipur, Burma, and Siam, often abundant in the forests of which the In (Eng) tree (*Dipterocarpus tuberculatus*) is the most characteristic species, more rarely met with in dry forests. It is a member of the natural family *Anacardiaceæ*, and bears the following vernacular names —*thit-si* or *thit-tse* (Burm.), *khéu* (Manipur), *suthan* (Taleing), *kiahong* (Karen). In addition to yielding a varnish, the timber of the tree is valuable, being fairly extensively used, in the countries where met with, in the construction of tool-handles, anchor-stocks, furniture, &c.; it has been recommended for gun-stocks, &c. Gamble observes that it is handsome and worthy of being better known.

In the Gazetteer of Upper Burma and the Shan States, written by Sir James George Scott, repeated mention is made of *Melanorrhoea* varnish (*thit-si*). It is commonly found in the Mawk Mai district. In the May Myo sub-division the black varnish is one of the chief forest products. Much *thit-si* is still extracted in Monghong State. *Thit-si* is very abundant in the zones of forest in which the oak is merging into the *in-gyin* forest. It is universally collected, and one seldom sees a tree that has not been tapped outrageously. It is all consumed locally and

* Melanorrhoea usitata, *Wall., Pl. As. Rar.* i., 9–12, *tt.* 11, 12; *Fl. Br. Ind.* ii., 25; *Engler in DC., Phanerog*, 1883, *IV.*, 237–8; *Gamble Man. Ind. Timbs.* 217; *Brandis, Ind. Trees*, 202; *Watt, Ind. Art at Delhi* 1903, 218–24; *F. N. Williams, List of the Plants of Siam in Bull. L'Herb. Boiss. 2nd Series Vol.* v. 1905, *p.* 220; *Dict. Econ. Prod. Ind.* v., 207–10; *Seringe, Bull. t.* 4; *Pierre, Fl. For, Cochinchin, t.* 367B.

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there is no export. Such are some of the passages given by Sir James. During the Burma-Manipur Expedition of 1882, the writer was resident in the *Kabu* valley for some two months and took every opportunity to study the tree and the methods employed in tapping it. The Manipuris put great value in the varnish, and employ it extensively in forming a sort of patent leather, the varnish being used as the enamel for their harness and belting leathers. Their sword scabbards are also richly coated with the varnish, but curiously enough the bulk of the material produced in the forest on the Burmese side of the State is conveyed into Burma. In no part of Manipur is the clever art of lacquering basket-ware practised, which is carried to such perfection in Burma.

The sap obtained from the tree is essentially therefore, a Burmese product, so far as British possessions are concerned. In the Forest Administration Reports repeated mention is made of it, among the minor forest products. It is exported mainly from Pegu, also the Northern and the Southern Circles. In the report for 1900–01 mention is made of exports to the extent of 197,505 viss; in the following year the traffic fell to 85,000, and in 1902–03 was returned as being only 65,900 viss. These figures by no means, however, represent the total traffic, as they take no cognisance of production in private forests or of local consumption. There would appear to be no exports to India and practically none to foreign countries.

Review of Existing Literature.—Fully two hundred years ago interest appears to have been first aroused in Europe in the materials used in Japanese and Chinese varnish. Shortly thereafter also a few writers claimed the discovery of the selfsame material obtained from certain trees found in America. (*Cf. with Plukenets' Alm. Bot.* 1690, *p.* 45 *et Phyto. t.* 145, *f.* 2, *and Dillenius, Hort. Eltham*, 1732, *p.* 390). Kæmpfer described fully both the plant from which the varnish was procured and the method of its preparation in Japan (*Cf. Amœn. Exot.* 1712, *pp.* 191–5 *and plates*). The true varnish tree (and the varnish itself), he tells us, was known as *Sitz* or *Sitz-dsju*, but there was a false kind known as *Fasi no ki*. The former is *Rhus vernicifera*, a plant with which we are at present not concerned. Incidentally, however, we obtain in the dissertations of Japanese varnish the first suggestion of the existence of a Siamese and Burmese varnish and varnish tree. The Abbé Mazeas published in the Philosophical Transactions for 1755 (*p.* 157) a brief account of the Toxicodendrons or poison-trees of America, more especially the black dye which they afford. This drew a response from Philip Miller, published in the same volume of the Transactions. Miller reviews the discoveries and opinions of Kæmpfer, Dillenius, Catesby, Dudley, and Sherrard, more especially the fabled reputation of the plants in question as virulent poisons. In the Transactions for 1756 (*p.* 866) this was followed up by Mr. John Ellis, who wrote an article on "*An Attempt to Ascertain the Tree that yields the Common Varnish used in China and Japan; also to Promote its Propagation in our American Colonies*," and arrived at the conclusion that Miller and others who identified Kæmpfer's Japanese plant as being identical with the North

American species were in error. Ellis then states that Father D'Incarville had sent seeds of the Chinese varnish tree from Pekin, and that the plant was at that time being grown in the Chelsea Physic Garden.

All the above-mentioned authors follow Kæmpfer in discussing an inferior quality of varnish produced in Siam and Cambodia which was supposed to be obtained from an *Anacardium*, "the *Tonj Rak* that is tree *Rak*, the fruit of which is in our shops called *Anacardium* and in Cambodia known as *Lak Rak* and the varnish as *Nam Rak*." But it would now appear highly likely that the plant so indicated was in reality *Melanorrhoea usitata*. This opinion at all events seems to have been accepted by M. E. Spach (*Hist. Nat. des Veget.* 1834, *II.*, *p.* 202), who calls it "the Melanorrhoea varnish of Siam." Subsequent authors identified the Cambodia *Rak* of Kæmpfer as being *Semecarpus Anacardium*, but that plant has not, so far as I can discover, been recorded as met with in Burma nor in Siam, and is not likely therefore to be prevalent in either country. On the other hand, Williams (*l.c.*) speaks of the *Melanorrhoea* tree as met with across Siam from the River Salween to the River Mekong—"the plant which in Burma and Siam furnishes the largest quantity of *Mai rac*." There would thus seem no doubt that the *Melanorrhoea* of Wallich was the *Anacardium* and *Semecarpus* mentioned by the older authors as affording a varnish in Siam and Burma.

It is known to yield a brown gum and the wood is said to contain an acrid juice which causes much irritation to the parts of the body exposed to it, hence the wood-cutters object to fell the tree. That property is, however, possessed by many others of the same family, such as one or two species of *Rhus*, and in India more especially *Holigarna Helferi*—a tree of Chittagong and Burma, which has so evil a reputation that it can hardly be felled. The juice of *Semecarpus*, while it has been spoken of as being a natural varnish (*Hurst, Painter's Colours, Oils and Varnishes*, 1901, *p.* 470), so far as India is concerned never appears to be so used, though the pericarp affords the well-known marking-ink of the Indian laundry-men.

In the Edinburgh Journal of Science (*Vol. VIII.*, 1828) there appeared an article on *The Varnish and Varnish Trees of India*, written apparently by the editor—Sir David Brewster. He there describes a varnish made by Mr. Swinton in Sylhet said "to consist *two* parts of the juice of the *Bhela* (the *Semecarpus Anacardium*—the tree which bears the marking-nuts of India) and *one* part of the juice of the *jowar*. Articles varnished with it at Sylhet are of a most beautiful glossy black, and it seems equally fitted for varnishing *iron*, *leather*, *paper*, *wood*, or *stone*." The varnish in question was doubtless that of the plant here dealt with and not a preparation of *Semecarpus*.

Sir David then discusses "the *Tsi-tsi*, or varnish of Rangoon, which, he says, is less known than the Sylhet varnish. Mr. Swinton considers it to be made from the juice of the *Bhala* or *Semecarpus Anacardium* alone." "The varnish from the *Kheeoo* or varnish tree may be the same as the Rangoon varnish, but it is at present considered to be different. The *Kheeoo*" (*khiu*, as we

would now write it) "grows particularly in the Kubboo, a valley on the banks of the Ningtee between Munnipore and the Birman empire."

Sir David Brewster concludes his observations by a reference to Dr. Wallich's discoveries of the Burma varnish tree and then narrates certain experiments that he had himself performed with the varnishes of Burma and Sylhet. A small quantity of each was placed between two plate glasses and the plates pressed together till the thin film of varnish became transparent. Upon examining this film through a powerful microscope it was observed the fluid was not "homogeneous" but "organised," and "consisted of immense congeries of small parts which exhibited the finest example of mottled or striated colours. These particles dispersed the sun's rays in all directions like a thin film of unmelted tallow or like organised fluids such as blood and milk." "After standing two days exposed to the action of the air, I found," continues Sir David, "that the portions which the air did not reach, viz., between the glass plates, exhibited the same constitution as before, while that which was squeezed out between the glasses and on which the air freely acted had become of a fine colour like that of treacle. I now placed this portion between two plates of glass, and found, to my great surprise, that the organised structure of the fluid was entirely gone, that it was perfectly homogeneous and showed the sun of a beautiful red colour. The action of the air had completely disorganised the vegetable juice and reduced it to a condition of complete fluidity."

These results speak for themselves, and I reproduce them *first* because they give the key to the industrial utilization of the varnish, and *second* because hardly any other observer in the eighty odd years that have since transpired can be said to have published much of greater interest than these simple experiments regarding this much neglected substance.

The next account of the varnish, in historic sequence, is that given by Dr. N. Wallich, in his *Plantæ Asiaticæ Rariores* (1830). He there narrates his discovery of the plant at Prome, Tenasserim, &c., and determines the Manipur and Sylhet plant described by Swinton, Grant, and Smith as being one and the same with the Burmese varnish tree for which he gave the name *Melanorrhoea usitata*. According to Wallich, the person who first made known this substance was Mr. M. R. Smith, who sent in 1812 particulars regarding the tree to Mr. H. Colebrooke, from which it has to be inferred that the so-called Sylhet varnish of Swinton and others was in reality Manipur varnish brought into India *viâ* Sylhet, hence called by that name.

Perhaps the next mention of this substance occurs in the Proceedings of the Committee of Commerce and Agriculture of the Royal Asiatic Society for 1838, in which the Secretary invites the attention of the Committee to the Burmese varnish (*thitsi*) which Dr. Wallich had identified as being the same as the *kheu* or Varnish-tree of Manipur.

Extraction of Sap.—Sir D. Brandis (*Indian Forester*, *I.* (1876) 362–7) furnished a highly instructive paper called "Notes on the

Burmese Varnish," which gives a more complete account of the separation of the sap and the production of the crude varnish than has been furnished by any subsequent writer. He speaks of the tree as resembling in foliage the Burmese *Semecarpus*. "The process of extraction was described to me by a Shan who had settled at Tyemyouk four years ago, and had, like many thousands of his countrymen, emigrated from Upper Burma into British territory with his entire family. Near Myouk, six miles further north, *Thitsee* is collected by the Burmans, also emigrants from Ava." "The trees which have been tapped are at once known by triangular scars about 9 inches long and 5 inches broad, the apex pointing downwards. On some trees we counted 40 to 50 of these scars and some of them at a height of 30 feet." The notches, to extract the varnish, are made with a peculiarly shaped iron chisel 15 inches long. "With this instrument two slanting slits, meeting at an acute angle, are made upwards through the bark, and the triangular piece of bark between the two slits is thus slightly lifted up, but not removed. A short bamboo tube about 6 inches long with a slanting mouth and a sharpened edge is then horizontally driven into the bark below the point where the two slits meet, and the black varnish, which exudes from the inner bark near its contact with the wood, runs down into the bamboo tube, which is emptied at the end of 10 days, when it ceases to flow. A second cut is then made so as to shorten the triangular piece of bark which had been separated from the wood when the first cuts were made. A shorter triangular piece of bark remains, ending in an angle less acute than before." The edges of the original cut are made afresh, and the bamboo tube raised a little near the new scarification. "The varnish then runs out for another 10 days, after which the scar is abandoned. The trees vary in yield exceedingly. A crooked tree with scanty foliage, which we examined, was said to yield a good out-turn, while some of the largest trees were said to yield very little. We saw trees tapped which had a diameter of only 9 inches." One man could make and look after 1,200 scars and could do 200 in a day, so that the whole number would occupy 6 days which would leave 4 days for rest. They only work in those parts of the forest where the tree is abundant, and the trees fit to tap stand close together. "The tree yields nothing while it is leafless in the hot season, and the best season for working is from July to October. One man collects 40 to 50 viss (146 to 182 lbs.) in one season. At Tyemyonk the viss sells at 12 annas and at Rangoon for 1 rupee."

Localities of Supply and Materials used.—Mr. H. E. Tilly, in his most interesting and highly artistic book on the *Glass Mosaics of Burma* (1901)—an art which depends very largely on the utilization of *thit-si*—says, "It is not an art indigenous to Burma, but was introduced from Siam after an invasion of that country by Naungdawpaya, son of Alaungpaya, and to this day some of the best masters of the craft are Shans." The close resemblance of the Burmese name *thit-si* to the names *sitz* or *sitz-dsju*, given by Kæmpfer as the Japanese for the varnish of that country (a substance derived from a closely-allied plant to the varnish tree of Burma), is perhaps more than a coincidence. It is also somewhat significant that the modern Japanese name appears to be quite

different, namely, *Urshi-no-ki* (*Cf. Useful Pl. Jap.* 1895, *p.* 87; *Rein, Industries of Japan, pp.* 158–64 *and* 338–77). Tilley says that the best qualities of the *thit-si* come from the Shan States and cost Rs. 2–8–0 a viss. Mr. N. K. Fraser speaks of the best qualities coming from the Chindwin and Shan countries. The quality known as *a-young-tin thit-si* is procured in Burma itself. In certain stages an oil is largely used which is composed of one proportion of *thit-si* and half a portion of Shan oil—the oil of Sesamum known as *Shansi*.

Mr. H. E. Tilly, in an article on lacquer-ware in Burma (*Cf. Mukharji's Art Manufactures of India, pp.* 259–60), says, "The lacquer-ware used in British Burma is of two kinds; (1) that in which the article is made of basket-work lacquered over; (2) that in which the article is made of wood." In Lower Burma the trade is largely confined to the latter class such as the large round platter with a raised edge, in which the family dinner is served, round and square boxes and bowls. Max and Bertha Ferrars (*Burma, pp.* 101–3) speak of "the exudation of the bark of *Melanorrhoea usitata*, a common tree of the *In* forests. The gum blackens to jet on exposure to the air. It dries slower than the 'Japan black' of Commerce but is much tougher. A peculiarity of *thissi*" (*thit-si* of other writers) "is that it sets hardest in a moist atmosphere. Every manufacturer has an underground cellar —a thing almost unknown in Burma—for the wares to harden in. Pagan, the centre of the industry, is at the same time the driest locality of the dry zone."

The materials used are the oleo-resin *thit-si*. This is often employed in a liquid state as a varnish, or it is thickened by saw-dust, cow-dung ashes, or bone-ashes to a plastic condition and used as a cement, a body material, or moulding substance. It may be coloured with lamp-black, with gold leaf, with vermilion (not red lead), with orpiment, with indigo, &c., and may be applied with a brush or by the hand direct, or to an object revolving on the turning lathe. It has been affirmed that the coating with vermilion-coloured varnish must be done in the sun, not in the shade, otherwise the red colour will be destroyed. The more liquid forms may be utilized as varnish to wood-work or to make paper or cloth waterproof (as in the manufacture of Burmese umbrellas), or when thickened can be used as putty to fill up defects in wood-work, or to close the meshes of basket-work, horse-hair work, &c., in order to convert these into water-tight drinking-cups, betel-leaf boxes, &c.; or it may be the cement employed in the manufacture of glass mosaics, and lastly, and by far its best known purpose, it is the chief material in the production of Burmese lacquer-ware.

Mr. N. K. Fraser furnished a most interesting report on this industry in 1889, in which he says the bamboo in most general use is the *Tinwa* (*Cephalostachyum pergracile*). The workman starts by dividing the bamboo into separate parts, retaining one knot of the bamboo to each part. Each is now taken and split down the middle, each half being again sub-divided into what is called *hni-laung*. The knot is now cut off from each *hni-laung*. The finest splitting is effected by cutting from the root end of

each *hni-laung* towards the top. These specially prepared *hni-laungs* are now deposited in water for three days, in order to soften the bamboo. When this has been accomplished, the bamboo is now ready for splitting into slender strips as desired. The inner and outer bark of the bamboo from each *hni-laung* is first stripped off and thrown away. The outside strips taken from each piece are used for the ribs of the basket, the inside ones for the weaving of the frame-work. The baskets are worked over a mould and are commenced by four longitudinal strips being laced together and other eight longitudinal strips, half the thickness of the four chief ones, being fixed in their positions. The four long strips are now divided each into three, the middle division being removed and the eight subsidiary strips are split each into two. The fine transverse strands or weft of the text are now woven within the longitudinal warp and the structure formed as closely on the mould as possible. When complete the key of the mould is removed by which the mould may now be separated in pieces.

Ferrars very truly remarks that so accurately and beautiful are the Burmese wicker-work baskets made that "at first sight it appears incredible that these exact cylindrical boxes with their trays and covers, fitting as if each piece had been turned out of the block, should start from a wicker-work frame. Yet so it is; the models are plaited so true that the rest of the work can be done on a lathe. To prepare the wicker for lacquering, it is first given a rough-stuffing of fine clay to fill the interstices. The work is then painted with *thissi*, which penetrates and toughens the clay and binds the fibres of the wicker. When the *this-si* has set, which takes several days, the work is put on the chuck of a bow-lathe and ground smooth with a fibrous stone. Varnishing and grinding are repeated till the surface is smooth, colour being added to the later coats."

There may be said to be two main stages in the work: 1st. Loading the articles with the thickened *thit-si*. All the imperfections are filled up by a putty made of the commoner sort of *thit-si* mixed with saw-dust or cow-dung ashes. Layer upon layer, for some 20 to 30 times, the *thit-si* is applied, while bits of cotton rags are stretched across and around joints and cracks (if the lacquer is being applied to wood-work) and thus imbedded within the *thit-si*. After each application the article is laid aside for a few days to dry slowly in the damp confined atmosphere of the underground pit. It is again and again removed and washed in water, rubbed down, smoothed, polished with sand-paper and a peculiar red mud, and again coated with fresh layers of *thit-si*. If circular, it is placed on the turning-lathe (Plate 1, second artisan from the left) and gauged to the required size.

2nd. When the desired degree of loading and colouring has been obtained, the articles are rubbed all over by the hand with a fine quality of Shan *thit-si* varnish, and this may be repeated many times, the articles being rubbed down and varnished until the required degree of polish has been attained.

Chief Methods and Centres of Thit-si Work.—There are four chief types of lacquer-work and centres of production. These are (1) Pagan basket-ware; (2) Prome gold lacquer boxes and

baskets ; (3) Mandalay boxes, thrones, &c., with moulded lacquer ornamentations ; (4) Burmese mosaic work ; and (5) Manipur varnished wares.

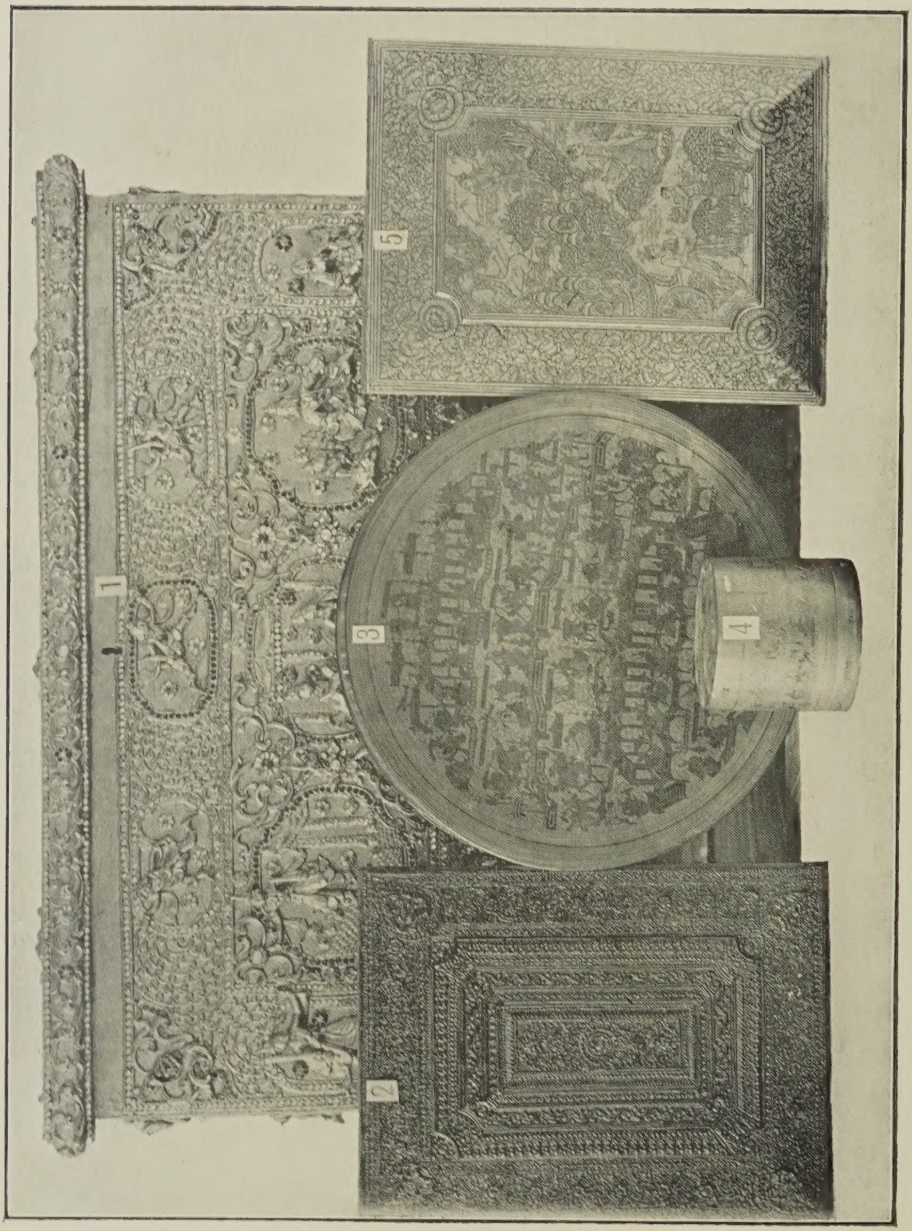
1st. **Pagan Ware.**—This is mainly if not entirely done on basket-ware or horse-hair boxes. The lid of a large wicker-work box is shown on Plate 2 (fig. 3) and a betel-nut box (fig. 4). These have been ornamented as follows :—An article prepared as above described is put on the turning-lathe and the gloss of the varnish removed, thus leaving a perfectly smooth surface. It is then handed over to the designers and engravers, often young girls such as the one shown in the centre of the group (Plate 1). By means of a fine metallic scriber a certain portion of the pattern is engraved all over, the spacing and assortment being done unerringly by the eye and without any previous delimitation or drawing.

After being engraved the article is handed to another operator, who places it on the turning-lathe, and taking a small quantity of some dry metallic pigment in the hand, rubs it all over, and thus loads the engravings with the colour. The excess is rubbed off and the colour fixed by a coating of varnish. Or it may be that the colour is given in the liquid form of a varnish, the excess of which is removed, leaving the tinted pattern within the original ground colour. After being placed aside to dry, the article is handed back to the engraver, and other portions of the design are scratched or chiselled out and loaded with their special colours and thereafter varnished. Time after time this process is repeated until all the colours desired have been added and the design completed. The article is then given one or two final coatings of varnish. Such is the process as witnessed by me in Pagan in 1903, but it will be seen to differ in some respects from that given by other observers.

Mr. Rories communicated through the Conservator of Forests, Southern Circle, Burma, a highly instructive report in December, 1900. He indicates 25 stages of work before the betel-box is complete. One interesting circumstance mentioned may be here added to the above abstract account, namely, that after being coated with each layer of *thit-si*, 3 to 6 days are usually sufficient for it to dry, but in hot weather a longer period may be necessary—namely, up to 15 days.

The patterns followed by the Pagan workers are as a rule overburdened. There is an entire absence of any knowledge in the value of spacing or of contrasts. Their designs, as will be seen from Plate 2, fig. 3, recall strongly the Chinese willow pattern—rivers, bridges, boats, trees, assorted in zig-zag panoramic effects, within winding panels. The trees shown are mainly the plantain and cocoanut, and the scroll-work employed recalls forcibly the Chalukyan and Dravidian of Mysore and Travancore, but has little in common with the Hindu and Muhammadan conventional arts of India.

2nd. **Prome Ware.**—After an article has been prepared according to most of the stages above indicated and left in its final varnishing as black or red, it is re-varnished and gold leaf pressed on to the partially dried *thit-si* sizing. This would give gold lacquer. But



REPRESENTATIVE GROUP OF BURMESE LACQUER-WARE.

(1) Mandalay moulded work; (2) embossed work; (3) and (4) Pagan ware; and (5) Prome gold lacquer.

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if it be contemplated to elaborate a pattern in gold lacquer, or any portion of it, a paint is prepared of finely powdered orpiment and gum. By means of a brush this is applied to the black or red surface, a picture being painted with this special orpiment paint, but the design must be complete before the coating of *thit-si* has set completely. The whole is then coated over with gold or silver leaf and the article placed on one side to dry. It is next carefully washed in water, when the elevated designs in paint soften and are carried away, thus revealing the black or red original colour constituting the picture upon the now gold or silver background.

This art is practised in Prome, and constitutes the gold and silver lacquer-ware for which that town is famous. The usual design is that shown, Plate 2 (fig. 5), a central panel in quasi-Chinese willow pattern, framed in scrolls of closely compacted floral ornamentations.

3rd. **Mandalay Moulded Lacquer.**—In Mandalay and elsewhere in Upper Burma one of the most interesting uses of *thit-si* may be studied. The Oleo-resin is thickened with carefully prepared rice husk or cow-dung ashes, until it attains the consistence of putty. In this condition it is perhaps one of the most convenient and useful moulding materials known. A stone or board, previously dusted over with fine ashes, is used as the moulding table. The *thit-si* is then broken off in lumps of the required size, and between the fingers is readily and easily moulded into the form of the bodies of animals, each leg, arm, finger being separately made and stuck on in the desired attitude. By means of a few specially made wooden modelling tools, the details are sharpened up, and when ready the figure is lifted off the table and transferred to the freshly sized surface on which it is to be affixed permanently. It is then given a few finishing touches before being varnished over with *thit-si* and placed in the pit to dry. Plate 2 (fig. 1) shows a *Hpungi* (or priest's box), the outer surface of which has been richly ornamented in the manner described. It will be observed also that certain medallions in the design have been studded with coloured glass or minor gems imbedded within the soft *thit-si*.

This art is largely used for the ornamentation of fancy boxes, idol thrones, as also the stands on which *hpungi* coffins are deposited. The same material and method is often adopted in the ornamentation of the many-storied and many-trayed baskets in which Burman ladies store their treasures and jewels. The foundation of these is, of course, wicker-work lacquered over, in the manner described in connection with Pagan ware, with, in addition, moulded work round the outer surfaces and along the rims, elaborated in rich scrolls and grotesque animals and other floral and animal designs. In the preparation of these scrolls or mouldings blocks are largely used. The *thit-si* is rolled into strips of the desired thickness, then placed on the table and a mould of soapstone pressed over the top. The material is thus compressed into border pieces or ribbons, which, like the insertions in embroidery or the metallic braidings used in Europe for similar purposes, may be taken up and laid along as required, and, as they soon set with the size, become permanently secured as surface

ornamentations. The work is thus rapid and easily accomplished, the effect charming, and the capabilities infinite, on lines not dreamt of in Burma.

For portfolio covers, panels of wood are coated with *thit-si* and embossed with the greatest ease. This form of moulding material is usually made with bone-ash as the thickening substance. A thick layer is placed over the sized plaque or other object, and while still plastic a soapstone mould is pressed home. If it be desired to illuminate portions of the design, the mould is removed and pieces of coloured glass pressed into the portions where coloured elaborations are deemed necessary. It is then allowed to set, and may be sized and gilded or coloured in any fashion desired, and finally varnished over and placed aside to dry slowly. Plate 2 (fig. 2) shows portfolio boards with a rich design in black moulded lacquer resembling the most elaborate carved black ebony work.

4th. **Burmese Glass Mosaics.**—From Siam came the art of wall decoration by coloured glasses imbedded in a layer of *thit-si* putty. While this is practised all over Burma, the examples of the Great Pagoda of Rangoon are far superior to the mosaics of the other pagodas. Reference has already been made to Mr. Tilly's most excellent work on the "*Glass Mosaics of Burma*," and the reader should consult that work for illustrations of this remarkable art. The putty used for ordinary work is made of the common grades of *thit-si* thickened with saw-dust. For finer work the *thit-si* is boiled until it begins to crackle, when it is sprinkled with water and allowed to cool. It is then thoroughly mixed with cow-dung ash and beaten on a block of wood with a stick, ashes being added until the right consistency is obtained. It must be used while fresh and before it hardens. This fine putty is then formed into long strips one-tenth of an inch in thickness and is slightly powdered with fine ashes. Ornaments are next constructed of it (in the manner described in connection with Mandalay moulded work) and applied to the larger mosaics of wall decoration as may be desired. With glass mosaic generally, coarse saw-dust *thit-si* is laid on the plastered wall until an even surface is obtained. It is then varnished over with liquid *thit-si* and allowed to dry. The surface is next rubbed down with a smooth stone. The pattern is now marked on the prepared surface with powdered chalk. The glasses, ready cut, are each given a small coating of *thit-si* on the back and pressed firmly on to the part of the design which they are each intended to occupy. Cords of *thit-si* putty are now placed around and between each piece of glass and carefully moulded with the knife so that they become not only the final binding portions of the *thit-si* but the finishing touches in the design. The whole is lastly coated over with liquid *thit-si*, and if the dividing lines are intended to be gilded, gold leaf is pressed on to the size before it has had time to set. The glass surfaces are then cleaned, when it is found that the most elaborate designs have been traced on walls or around pillars, and as the material sets firmly it is remarkably durable.

5th. **Manipur Varnished Wares.**—Some few years ago a reference was made to Col. H. St. P. Maxwell, Political Agent of Manipur, for information and specimens of the utilization of the oleo-resin

in that State. In consequence an admirable series of specimens (now deposited in the Indian Museum, Calcutta) and a report of great interest came to hand. The inquiry was conducted by Rai Rasik Lal Kundu Bahadur, Superintendent of the State. The *Kheu* trees he tells us are tapped by triangular incisions similar to those described by Sir D. Brandis in connection with Burma. The extract is collected in bamboo tubes. When sent to a distance it is placed in tins along with a little water to prevent the oleo-resin drying, but it is affirmed the water will not mix with the *kheu* nor will it in any way affect the quality of the same.

When intended to be used, the natural varnish is carefully strained through a piece of strong muslin. It is then mixed with a little more than its own weight of cow-dung ash, the two being well pounded in a mortar for about half an hour. It may then be smeared over the article of wood, stone, leather, iron, brass or other material that it is desired to lacquer. In the course of three or four days, in hot weather, the article will have dried sufficiently for the further stage to be proceeded with. It is rubbed with a stone and finally with the rough leaves of *Ficus Cunia* until it is quite smooth. It is then soaked in water and again polished with the leaves, and then once or twice coated with pure *kheu* varnish. This is prepared by straining the oleo-resin once or twice through cloth. The varnish is then quite liquid and is best put on by the hand. If this coating does not give the degree of polish desired, after being thoroughly dried, the article is again soaked in water, rubbed down by the fig leaves and coated a second or third time with the varnish. The proper season for varnishing is March to November.

Such are some of the chief uses of the sap of *Melanorrhoea usitata*, a varnish of great merit and immense possibilities that at present practically takes no part in the arts and industries of Europe and America.

GEORGE WATT.

July 5, 1906.

XXV.—SOME NEW CHINESE PLANTS.

An interesting and valuable collection of plants was made in China during 1899–1902, and again during 1903–1905, for Messrs. James Veitch & Sons by Mr. E. H. Wilson. The first set of this collection was very generously presented to the Herbarium at Kew by Messrs. Veitch, and it was hoped that eventually Mr. Wilson, in collaboration with Mr. W. B. Hemsley, might prepare a paper in which the whole collection could be systematically dealt with. Before, however, this undertaking could be completed, Mr. Wilson had to take up duties that render it impossible for him at present to continue his share of the work. As, however, the collection contains a number of obvious novelties, nearly all of which are of considerable interest, it has been thought desirable to publish descriptions of these without delay and in anticipation of the larger and more general contribution which it is to be hoped may eventually appear.

Clematis Faberi, *Hemsl. et E. H. Wils.*; species habitu prostrato distincta, ceteroquin ad *C. Prattii*, *C. japonicam*, et *C. pogonandram* accedit, ab eis tamen foliis subcarnosis, foliolis integris, floribus luteis, sepalis carnosis et filamentis latioribus recedit.—W. B. H.

A small-growing prostrate species; old branches reddish, glabrous; young branches straw-coloured, pubescent. *Leaves* trifoliolate, including the petioles 6–8 cm. long; petioles pubescent; leaflets shortly petiolate, ovate, or obliquely-ovate, terminal one largest, 5 cm. long, 2·5 cm. wide, acute, entire, dark green above, glaucous beneath, sparsely pubescent, 3–5-nerved. *Flowers* yellow, solitary, axillary, ebracteate; peduncles slender, twining, 5–6·5 cm. long, sparsely pubescent. *Sepals* fleshy, suberect, elliptic, 2–2·5 cm. long, about 1 cm. broad, abruptly acute, pubescent inside. *Stamens* about 1·5 cm. long; filaments equally dilated throughout, with few or many scattered long hairs on the dorsal surface; anthers introrse, villous; staminodes none. *Style* plumose, half the length of stamens.

Western Szechuan. On rocks, at elevations between 2700–3000 m., *Wilson*, 3125; summit of Mt. Omi, *Faber*, 731.

In a living state this is one of the most distinct of all the Chinese species of *Clematis*.—E. H. W.

By an oversight, Faber's 731 was referred (*Kew Bulletin*, 1892, p. 82) to *C. Prattii*, Hemsl., as were also Dr. A. Henry's 6817, which is *C. pogonandra*, Maxim., and 4920 and 6704, which are *C. otophora*, Franch.—W. B. H.

Clematis hupehensis, *Hemsl. et E. H. Wils.*; species ex affinitate *C. otophorae*, a qua foliis pinnatim 7-foliolatis, foliolis minoribus et staminibus pilis longis suberectis (nec patentibus) vestitis differt.—W. B. H.

A slender climber, glabrous except the flowers. *Leaves* pinnately 7-foliolate; petioles very slightly dilated at base, almost filiform as well as the petiolules; leaflets ovate, rounded at base, 2·5–5 cm. long, 0·5–2·5 cm. broad, acute, mucronate, entire, shining above, somewhat glaucous beneath, indistinctly 3-nerved. *Flowers* usually solitary, rarely three, on short axillary shoots, yellow, about 2·5 cm. across; peduncles slender, 4 cm. long, furnished with two small, opposite, elliptic bracts. *Sepals* suberect, ovate, acute, 2·5 cm. long, 8 mm. broad, glabrous outside, pubescent inside. *Stamens* shorter than the sepals, clothed with long suberect hairs, filaments equally dilated throughout; staminodes none. *Style* plumose, rather shorter than the stamens.

Hupeh. Mountains to the north-west, in woods and shrubberies, at elevations of 1500–2100 m., rare, *Wilson*, 2548.

This and *C. otophora*, Franch., are the only two yellow-flowered species of *Clematis* known from Central China. The two species may be easily distinguished by their very different foliage.—E. H. W.

Anemone (§ **Euanemone**) **Wilsoni**, *Hemsl.*; species *A. baicalensi* similis, sed petiolis pilis longis patentibus brunneis sericeis vestitis, lamina subtus glabra ad medium trilobata et lobis rotundato-crenatis apiculatis differt.—W. B. H.

Rootstock stoloniferous. *Leaves* suborbicular with cordate base, distinctly trilobed; lobes crenately-toothed, teeth mucronate, under surface reddish-purple with scattered appressed yellowish hairs, upper surface green, sparsely pubescent; petioles slender, 10 cm. long, clothed with yellowish-brown villous hairs. *Scapes* 1-flowered, 8–15 cm. high, clothed with a pubescence similar to that of the petioles. *Involucre* about 4 cm. below the flowers; bracts 3, small, free, cuneate, usually trilobed; lobes acute. *Flowers* 2·5 cm. across, pale pink. *Sepals* 6–8, obovate, about 1 cm. long, rounded, the outer pubescent on dorsal surface. *Stamens* short; filaments 2 mm. long, simple. *Pistils* pubescent; stigma practically sessile.

Western Szechuan. Woods and shady places at elevations between 2100–2700 m., *Wilson*, 3038.

This pretty woodland species suggests *Anemone Hepatica* in habit and size of flowers.—E. H. W.

Anemone (§ **Euanemone**) **Millefolium**, *Hemsl. et E. H. Wils.*; species habitu *A. albanae* sed ab omnibus speciebus hactenus descriptis foliis tripinnatisectis segmentis parvis numerosissimis longe recedit.—W. B. H.

Rootstock spindle-shaped, woody. *Leaves* rosulate, spreading, pilose below, oblong, 5–10 cm. long, 2·5 cm. broad, tripinnatisect, ultimate segments very small, acute. *Scapes* usually solitary, one-flowered, 15–20 cm. high, erect, pilose. *Involucre* about 5 cm. below flowers; bracts 3, cohering at base, 1–1·5 cm. long, deeply cut into linear segments. *Flowers* about 4 cm. across, rose-purple. *Sepals* 6, suberect, about 1·5 cm. long, 6 mm. broad, narrowly ovate-oblong, rounded at the tip, entire or toothed, more or less hairy on the outside. *Stamens* less than half the length of the sepals but overtopping the styles; filaments dilated at base. *Styles* densely clothed with white, silky hairs.

Western Szechuan. Yalung Valley, at about 3000 m. in dry stony places, rare, *Wilson*, 3050.

A very remarkable species with foliage very like that of *Achillea Millefolium*, only smaller.—E. H. W.

Magnoliaceae.

Michelia sinensis, *Hemsl. et E. H. Wils.*; affinis *M. obovatae*, ab ea foliis oblanceolatis, stipulis quam petiolis duplo triplove longioribus, bracteis floralibus hirsutis, petalis paucioribus et carpellis breviter rostratis differt.—W. B. H.

A hard-wooded tree, 6–15 m. high; bark pale grey. *Leaves* obovate-oblong or oblanceolate, narrowed into a short petiole, 10–15 cm. long, 5 cm. broad at greatest width, abruptly obtusely acuminate, strongly reticulate, glaucous beneath, at length quite glabrous, midrib somewhat tuberculate; petioles rather under 1·5 cm. long. *Stipules* caducous, narrowly oblong, acuminate,

three times the length of petiole. *Flowers* solitary, axillary, shortly pedunculate, 5–7·5 cm. across, ivory-white, strongly aromatic; peduncles stout, 8 mm. long, annular, pubescent; bracts covered with brown hairs. *Sepals* and *petals* 10, spathulate to linear-oblong, rounded or acute. *Stamens* very caducous, 1·2 cm. long; filaments shorter than the anthers; anthers mucronate. *Carpels* when young minutely glandular-pubescent; stigmas red. *Fruits* 15–20 cm. long; carpels woody, subsessile, obovoid, lenticellate, shortly beaked.

WESTERN SZECHUAN. Mt. Omi and mountains to the westward, at about 1000 m., *Wilson*, 3136, 4720.

A handsome evergreen tree with conspicuous flowers. Rare and only met with in woods and forests of Western Szechuan.—E. H. W.

Schizandra pubescens, *Hemsl. et E. H. Wils.*; ab omnibus speciebus hucusque cognitis pilis plano-compressis crispis flaccidis unicellularibus recedit, ceterum *S. glaucescenti* proxima, a qua foliis majoribus non glaucescentibus, venis primariis subtus prominentibus, sepalis petalisque orbicularibus extimis pubescentibus et filamentis latissimis differt.—W. B. H.

Stems angular, purple, glabrescent. *Leaves* papyraceous, ovate or suborbicular, including the petioles 9–12 cm. long, 4–6 cm. broad, rounded or cuneate at base, acutely acuminate, remotely toothed, ultimate veins terminating in minute callous teeth, glabrous above, below, as well as the petiole, clothed with short, flattened curled appressed hairs; primary veins prominent below. *Flowers* white, 2 cm. across, solitary, axillary; peduncles very slender, 4 cm. long. *Sepals* and *petals* 9, broadly obovate to orbicular. *Stamens* about 15, closely imbricated; filaments fleshy, oblong or almost square; anther-cells widely separated. *Pistil* of numerous carpels winged on the ventral line; styles short, simple, deciduous. *Fruit-carpels* subsessile, 1- or 2-seeded, 5–6·5 cm. long, orange-coloured, pendulous; axis fleshy, cylindrical.

HUPEH. Changyang, *Wilson*, 2234; Patung, *Henry*, 1785; Chienshih, *Henry*, 5907.

This species is not uncommon on the margins of woods and shrubberies in South-Western Hupeh, at elevations between 1200 and 2200 m. The attractive yellow flowers are succeeded by the still more conspicuous orange-red fruits.—E. H. W.

MENISPERMACEAE.

Cocculus heterophyllus, *Hemsl. et E. H. Wils.* (nomen novum). *Cocculus* (?) *diversifolius*, Miq. in Ann. Mus. Bot. Lugd.-Bat., vol. iii., p. 10; Prol. Fl. Jap., p. 198, non DC.

HUPEH. Nanto and mountains to the northward, *Henry*, 2014, 2590; Ichang and immediate neighbourhood, *Henry*, 4105; Nanto and other localities, *Wilson*, 1203, 1203*a*, 1483, 1483*a*, 2267, 2675.

SZECHUAN. Mt. Omi, *Wilson*, 4718.

Also in Japan.

Some of the specimens are very similar in foliage to *Pericampylus incanus*, Miers, but easily distinguished by the elongated inflorescence usually exceeding the leaves. Of the numerous specimens examined none bears female flowers.—W. B. H.

Berberidaceae.

Berberis Wilsonae, *Hemsl.*; species adspectu *B. Thunbergii* similis, differt spinis infra foliorum fasciculos 3, foliis crassissimis eximie reticulatis ficres excedentibus et floribus numerosis minoribus in racemos congestos dispositis.—W. B. H.

A deciduous semi-prostrate shrub, 1 to 2 m. high. *Stems* angular, reddish-brown, puberulous. *Leaves* fascicled, coriaceous, subsessile, cuneately-obovate or linear-oblong, 2–2·5 cm. long, entire, revolute, rounded or slightly truncate and emarginate, mucronate or obtusely acute, tapering into a very short petiole, glabrous, glaucescent below, strongly reticulated on both surfaces. *Stipular spines* always 3, acicular, rather under 1·5 cm. long. *Flowers* bright yellow, in sessile umbels or shortly stalked corymbs, bracteate; bracts small, scale-like, concave, shortly acuminate; pedicels erect, 4–6 mm. long. *Sepals* 6, obovate-orbicular, 2–3 mm. long, outer whorl half size of inner and reddish; veins prominent. *Petals* 6, obovate, rather smaller than the sepals, rounded, obtuse. *Stamens* shorter than the petals. *Stigma* shortly stipitate. *Fruit* globose, salmon-red, 1–4-seeded.

Western Szechuan. Scrub-clad mountain-sides, 900–1800 m., *Wilson*, 3154, 3147. Henry's 4675 from Patung, Hupeh, is probably this species.

Remarkable amongst the Chinese species of *Berberis* for the brilliancy of its autumnal tints.—E. H. W.

Berberis verruculosa, *Hemsl. et E. H. Wils.*; inter species foliis simplicibus munitas *B. pruinosae* proxima, a qua cortice verruculoso, floribus majoribus solitariis vel binis, sepalis petalisque carnosis venosis et filamentis crassis clavatis facile distinguitur.—W. B. H.

An evergreen shrub, about 1 m. high. *Stems* yellowish, scabrid, densely covered with short thick, rigid hairs. *Leaves* in fascicles, coriaceous, subsessile, ovate or ovate-lanceolate, 1·5–2·5 cm. long, about 1 cm. broad, sharply acute, base narrowed to the very short petiole, remotely toothed, teeth sharp, spinescent, shining above, glaucescent below. *Stipular spines* always 3, acicular, 1–2 cm. long. *Flowers* solitary or in pairs, yellow, over 1 cm. across; pedicels erect, 4–10 mm. long, surrounded at base with a cluster of reddish scale-like bracts. *Sepals* and *petals* concave, broadly obovate to orbicular, rounded, entire, base shortly clawed, prominently nerved. *Stamens* 6; filaments stout, 2 mm. long; anther-cells short, widely separated. *Fruit* violet-purple, oval, crowned with the sessile stigma.—E. H. W.

Western Szechuan. Mountains around Tatien lu, in shrubberies, *Wilson*, 3150, 3150*a*.

Berberis (§ Mahonia) Veitchiorum, *Hemsl. et E. H. Wils.*; a *B. nepalensi* et *B. eurybracteata* foliolis multidentatis a basi pinnativenosis, racemis densioribus brevioribusque bracteolis auguste lanceolatis longe acuminatis flores excedentibus differt.—W. B. H.

An erect shrub, about 1 m. high, glabrous in all parts. *Leaves* coriaceous, 15–30 cm. long, shining above, yellowish below, 3–6-jugate; leaflets sessile, oblong, 5–10 cm. long, 4–4·5 cm. wide, acuminate, mucronate, base oblique, entire, regularly spinescent-dentate; lowest pair of leaflets small, terminal leaflet largest, oblong-ovate, base rounded; veins pinnate and reticulate; petioles very short, sheathing; rhachis angular, swollen at the point of insertion of leaflets. *Inflorescence* racemose, terminal; racemes about 8, in a cluster, ascending, 5–12 cm. long, bracteate at the base; bracts oblong, acute, 1–2 cm. long, fibrous, persistent. *Flowers* yellow, about 1 cm. across, densely crowded on the racemes, bracteate; bracts subulate, acuminate, 8–12 mm. long, overlapping the flowers, membraneous, persistent; pedicels 2–3 mm. long, naked, erect. *Sepals* 6, outer 3 oblong, shorter than the inner; inner oblong-ovate, obtuse, 6 mm. long, prominently veined. *Petals* similar to inner sepals, but smaller. *Stamens* 4 mm. long; anther-cells short; filaments flattened. *Fruit* bluish-black, ovoid, 6–8 mm. long, crowned with the small, sub-sessile stigma.

Western Szechuan. Cliffs 600–1800 m., *Wilson*, 3142. Mt. Omi, *Wilson*, 4725; *Henry*, 8993.

A rare and very remarkable species, known only from the neighbourhood of Mt. Omi. Its relatively large flowers and very long floral bracts give it a very distinct appearance.—E. H. W.

Podophyllum Veitchii, *Hemsl. et E. H. Wils.*; species foliis binis subcentrice peltatis saepius 8-lobatis, lobis acute trilobatis remote denticulatis, floribus inter folia opposita terminalibus et sepalis quam petalis paullo longioribus distinguitur.—W. B. H.

Stems erect, 12 to 20 cm. high, round, glabrous. *Cauline leaves* 2, opposite, papery, nearly centrically peltate, orbicular, about 20 cm. across, usually 6–8-lobed above the middle; lobes cuneate-oblong, often trifid at apex, sinus rounded or acute, irregularly coarsely toothed, ciliolate, slightly hairy below, upper surface glabrous, blotched with brownish-red. *Flowers* 3–6 in sessile terminal umbels; peduncles pendulous, 1·5–2 cm. long, pubescent. *Sepals* 6, membranous, 2 cm. long, caducous, oblong-obovate, rounded or subacute, outer whorl narrower and pubescent outside. *Petals* 6, purple, rather shorter than sepals, elliptic, rounded at apex. *Stamens* 6, slightly longer than petals; filaments very short and broad; connective fleshy, apiculate. *Pistil* half the length of stamens; ovary ellipsoid; style short, thick; stigma large, fringed. *Fruit* unknown.—E. H. W.

Western Szechuan. In woods and forests, 2500 m., *Wilson*, 3170.

Podophyllum difforme, *Hemsl. et E. H. Wils.*: species e grege floribus extra-axillaribus distincta, fere undique glabra, foliis tenuissimis circumscriptione variabilibus excentrice peltatis, nunc

semiorbicularibus apice vere truncatis, nunc varie lobatis asymmetricis inaequilateralibusque, lobis acutis remote calloso-denticulatis, floribus parvis, petalis tenuissimis discretis ligulatis obtusis.—W. B. H.

Rhizome slender. *Stem* 15–20 cm. high, glabrous. *Cauline leaves* usually two, alternate, rarely three with uppermost opposite, subequal, excentrically peltate, 5–11 cm. long, 7–15 cm. wide, papyraceous, glabrous, broadly truncate or occasionally more or less lobed, base more or less rounded, sparsely toothed, teeth mucronate, petioles subequal, 2·5–11 cm. long, glabrous. *Flowers* 3–5 in. pendulous, sessile umbels, extra-axillary, except when three cauline leaves occur; peduncles rather under 2 cm. long, recurved, pilose. *Petals* 6, salmon-pink, linear-oblong, about 1·5 cm. long, rounded. *Stamens* 6, half the length of petals, incurved, long apiculate; filaments half length of stamens. *Fruit* small, globose.

Hupeh. Woods at elevations between 1200 and 1800 m., *Wilson*, 966.

This delicate and rare species is the "Hsao Pā-chiao-lien" of the Chinese. The rhizome is highly valued as a drug.

From the description of *P. Delavayi*, Franchet (Bull. du Mus. d'Hist. Nat., 1895, p. 63), we suspect that it is very near this, as our plant has sometimes only one fully-developed flower; but the leaves of our plant are always excentrically peltate and the petals are rounded, characters opposed to Franchet's description.—E. H. W.

Cruciferae.

Cardamine (§ **Eucardamine**) **Prattii**, *Hemsl. et E. H. Wils.*; species ex affinitate *C. Griffithii* et *C. multijugi*, aquibus differt parvitate, foliis longe petiolatis, foliolo terminali 3–5-lobato, lateralibus oblique inaequilateralibus 2- vel 3-lobatis omnibus distincte petiolulatis, floribus albis majoribus numerosioribus et siliquis crassioribus.—W. B. H.

A creeping herb. *Flowering stem* ascending, 10–30 cm. high, rarely branched, usually pubescent. *Leaves* petiolate, pinnatisect, narrowly oblong, 6–7·5 cm. long, rather over 1 cm. wide, sparsely pubescent; segments obcuneate, acute, pinnatifid, terminal lobe palmately 3–5 lobed, 6 mm. long and broad, larger than the others, slightly cordate or truncate at base; petiole 1–2·5 cm. long, base dilated, pubescent. *Flowers* numerous, racemose, white, 1·5–2 cm. across. *Sepals* broadly ovate, sparsely pubescent. *Petals* spreading, four times the length of sepals. *Style* long, narrower than the pods. *Pods* 2·5–4 cm. long, stout.—E. H. W.

Western Szechuan. Moist alpine meadows at 3300–3700 m., around Tatien lu, *Wilson*, 3199; *Pratt*, 265, probably from the same locality.

Ternstroemiaceae.

Gordonia sinensis, *Hemsl. et E. H. Wils.*; haec species *G. Lasianthо* Americae borealis proxima, differt imprimis foliis majoribus acutis grosse serrato-crenatis, floribus minoribus, sepalis extra glabris et filamentis e comparatione longioribus fere liberis.—W. B. H.

Tree about 12 m. high. *Leaves* ovate-lanceolate, including petiole 12–18 cm. long, 5–6·5 cm. broad, shortly acuminate, base cuneate, crenate-serrate, coriaceous, dark green above, paler, often brownish, below; primary veins 10–14 on each side of mid-rib, very prominent on both surfaces; petioles stout, rather under 1·5 cm. long. *Flowers* erect, solitary, axillary, pedunculate, bracteate, 5–6·5 cm. across, white; peduncles stout, angular, 4–4·5 cm. long; bracts 2, immediately below calyx, obovate 8 mm. long. *Sepals* orbicular, 3–5 mm. long, ciliolate, glabrous outside, silky-pubescent inside. *Petals* ovate or obovate, 2·5–3 cm. long, about 1·5 cm. broad, rounded, connate at base, glabrous save at base, which is silky-pubescent. *Stamens* adnate to, and about $\frac{1}{3}$ length of petals; filaments flattened, subulate; anthers nearly globular. *Ovary* silky-pubescent, 5-lobed; style shorter than stamens; stigma large, capitate.

West Szechuan. Mt. Omi, rare, *Wilson*, 4805.

A strikingly handsome tree only met with on Mt. Omi. It is very distinct from all other Asiatic species, having a closer affinity with the American species *G. Lasianthus*, L.—E. H. W.

Icacinaceae.

Hosiea, *Hemsl. et E. H. Wils.*; genus novum Icacinacearum ex affinitate *Natsiati*, a quo habitu vagante non volubili, inflorescentia laxe cymosa, floribus polygamis, petalis longe inflexis, nectarii squamis carnosis rotundatis, filamentis filiformibus, stylis productis, embryone aurantiaco crasso carnoso quam albumine tenui vix breviore, cotyledonibus ellipticis et radicula brevissima recedit.

Hosiea sinensis, *Hemsl. et E. H. Wils.*, sp. unica —— *Natsiatum sinense*, Oliv. in Hook. Ic. Pl., t. 1900.

Hupeh. *Wilson*, 638; Chiensih, *Henry*, 5598*b*; South Patung, *Henry*, 7342.

Szechuan. Mt. Omi, *Wilson*, 4957; South Wushan, *Henry*, 5598, 5598*c*.

We have contrasted this plant with *Natsiatum* because it has been referred to that genus, but in several characters it approaches more nearly to other genera. Thus, the inflorescence and flowers are more like those of *Chariessa*, Miq. (*Pleuropetalum*, Bl.).

Sabiaceae.

Meliosma Kirkii, *Hemsl. et E. H. Wils.*; species a *M. Arnottiana* foliis majoribus, foliolis numerosioribus in eodem folio forma variabilibus subtus pallidis apiculatis et panicularum ramis primariis horizontalibus recedit.—W. B. H.

Tree 12 m. high; young branches reddish, lenticellate, rusty-puberulous. *Leaves* pinnately 7–13-foliolate, including petioles 12–50 cm. long; leaflets subopposite, shortly petiolulate, oblong-lanceolate, 4–15 cm. long, 1·5–4·5 cm. broad, basal pairs often shorter and broader, acuminate and mucronate, remotely toothed, dark green above, glaucescent and pubescent below, primary and

secondary veins prominent on under side; teeth mucronate; petiolules 6–10 mm. long, pubescent. *Panicle* 25 cm. by 45 cm., much-branched, terminal and axillary from the upper leaf axils; secondary branches of panicle horizontally disposed; all parts of panicle covered with short, rusty-grey indumentum. *Flowers* very numerous, densely clustered on the branches of panicle, white, shortly pedicellate; pedicels pubescent. *Sepals* 5, unequal, 2 outer the smaller, ovate, rounded, ciliolate, concave. *Petals* 5, 3 outer subvalvate, orbicular, rounded, concave, fugacious; 2 inner minute, scale-like. *Disk* cupulate, toothed. *Ovary* pubescent; style longer than stamens; stigma simple.

Western Szechuan. At 800 m., *Wilson*, 2371.

A very handsome low-level tree, not uncommon in the woods around the base of Mt. Omi and the low mountains to the south-west. Its large panicles of white flowers make it a conspicuous object in the woods.

Named in compliment to William Kirk, M.D., of the Chinese Imperial Maritime Customs—a keen lover of nature and the collector's companion on many rambles.—E. H. W.

Meliosma Veitchiorum, *Hemsl.*; inter species foliis pinnatis munitas foliorum et panicularum amplitudine distincta, foliis maximis fere metralibus, foliolis usque ad 20 cm. longis, paniculis terminalibus ad 40 cm. longis, ramulis insigniter lenticellatis et floribus albis innumerabilibus.

A tree about 12 m. high, the young parts more or less clothed with a rusty pubescence. *Flowering branches* very thick and, as well as the branches of the panicles themselves, thickly studded with large lenticels. *Leaves* imparipinnate, the largest nearly 1 m. long, of which about a quarter is petiole; leaflets usually 9 or 11, the lower elliptical or almost orbicular, about 6 to 7 cm. across; upper ovate oblong, and as much as 20 cm. long; the leaves immediately under the panicles are much smaller. *Panicles* erect, narrowly pyramidal, much-branched, 40 to 45 cm. long. *Flowers* white, exceedingly numerous, about 3 mm. in diameter. *Sepals* oblong, obtuse, about 1·5 mm. long. *Petals* obcordate, crested on the inside.—W. B. H.

Szechuan. South Wushan, at 1500 to 2000 m., *Wilson*, 1046.

Anacardiaceae.

Rhus Wilsoni, *Hemsl.*; species modo *R. semialatae* foliorum rhachi inter foliola alata, ceterum omnino diversa, foliolis 5–8-jugis sessilibus pubescentibus oblongis vel lanceolato-oblongis rotundatis apiculatis; etiam *R. copallinae*, praesertim varietati e Florida (Curtiss, 5129), similis sed foliis molliter pubescentibus, alis latioribus et foliolis paucioribus apice rotundatis differt.—W. B. H.

Bush, 65 cm. to 1 m. high; branches pubescent. *Leaves* 11–17-foliolate, including petiole 12–20 cm. long, 7–10 cm. broad; petiole 2·5–4 cm. long; leaflets subsessile, rarely sessile, lanceolate-oblong or oblong, 4–6·5 cm. long, 1·5–2 cm. broad, rounded, apiculate, base cuneate, dark green above, grey beneath, pubescent on both surfaces; rhachis decurrent. *Panicles* small, 10 cm. long,

dense, terminal and axillary in the upper leaves, thyrsoid; peduncles pilose. *Flowers* 3–5 mm. across, creamy-white, pedicellate, bracteate; pedicels 1–2 mm. long, hairy; bracts minute, scale-like. *Sepals* ovate, rounded, pubescent outside in basal half. *Petals* oblong, rather more than twice the length of sepals, rounded, base narrowed slightly; upper surface with prominent nerves, and bearded along the centre of lower half. *Stamens* rather more than half the length of petals; anthers large, yellow, *Disk* cup-shaped, slightly crenate, glabrous. *Styles* 3, free. shorter than stamens, angular; stigma simple; ovary pilose.—E. H. W.

WESTERN CHINA. Tung Valley, 600-900 m., rare, *Wilson*, 3370.

LEGUMINOSAE.

Ormosia Hosiei, *Hemsl. et E. H. Wils.*; inter species sinenses *O. striatae* affinis, differt foliis minoribus 5- vel 7-foliolatis, foliolis saepius supra medium latioribus, pedunculis brevioribus pauciflоris, pedicellis longioribus, et legumine ovali recto compresso fere plano.—W. B. H.

Tree 9–15 m. high, bark grey and smooth. *Leaves* pinnately 5–7-foliolate, including petioles 12–20 cm. long; leaflets oblong or oblong-ovate, 5–12 cm. long; terminal leaflet ovate and larger, acuminate, cuneate at base, subcoriaceous, dark green above, paler and prominently reticulate below, glabrous when mature; petiolules 6–8 mm. long, slightly thickened, pubescent, or glabrescent and somewhat tuberculate. *Leaf-buds* naked, covered with a dense brown velvety indumentum. *Flowers* few in terminal or axillary shortly stalked panicles; pedicels 1·5–2 cm. long. *Calyx* cupulate; sepals short, orbicular. *Ovary* yellowish-green, erect, 5–6-ovuled. *Legume* brown, woody, oblong, 4–6·5 cm. long, 2·5–3 cm. broad, laterally compressed, beaked. *Seeds* 1–2, bright red, 1·5–2 cm. long, flattened laterally.

CENTRAL CHINA. Changyang, rare, *Wilson*, 1994.

W. CHINA. Chentu, 500 m., *Wilson*, 3407.

This is the Hung-tao shu (Red bean tree) of the Chinese. A large umbrageous tree, rather scarce, with valuable, heavy, rich red-coloured wood, beautifully marked, and in great demand for making better class furniture, and for carving and other purposes. A short account of this tree is given in Hosie's Report on the Province of Ssu-chuan (Cd. 2247), p. 55. No. 3047 was collected from the identical tree mentioned in the report. The specimen from Central China has rather more membranous leaves than that from Chentu. Both are in fruit.

This species is named in compliment to Alex. Hosie, Esq., of H.B.M. Consular Service, China, to whom we are indebted for much information respecting Chinese economic products.—E. H. W.

Ormosia Henryi, *Hemsl. et E. H. Wils.*; species distincta foliolis 5–9 breviter petiolulatis patentissimis subtus albo-tomentosis, legumine crasso maximo 11 cm. longo 10-spermo inter semina spongioso-septato.—W. B. H.

Tree 6–9 m. high. *Leaves* pinnately 5–9-foliolate, including petioles 12–28 cm. long; leaflets elliptic or oblanceolate, 7–12 cm. long, 2–5·5 cm. broad, very shortly petiolulate, acute, margins slightly revolute, coriaceous, glabrous above, lower surface, rhachis and young shoots covered with short brownish-white velvety indumentum, as are also the peduncles, pedicels and calyx. *Flowers* in large much branched terminal or axillary panicles; pedicels 1–1·5 cm. long, bracteolate; bracteoles minute, scale-like. *Calyx* large, pubescent; sepals obovate, acute. *Legumes* 7–11 cm. long, 2–3 cm. wide, bluish-black, flattened, slightly beaked, 8–10-seeded. *Seeds* oval 8–15 mm. long, separated one from another by corky ingrowths from the walls of the pod.

KWANTUNG. *Ford*, 60.

CHEKIANG. *Hichen.*

HUPEH. Tree 6 m., smooth bark, wood bright yellow, *Henry*, 7577; Patung, tree 9 m., *Wilson*, 2587.

A very distinct tree not closely related to any known species. The four specimens in the Kew Herbarium are all in ripe fruit, and though collected in widely separated districts are absolutely identical.—E. H. W.

ROSACEAE.

Rosa multibracteata, *Hemsl. et E. H. Wils.*; species *R. Webbianae* similis, differt imprimis floribus saepius confertis pedunculis pedicellisque bracteis numerosis lanceolatis instructis, carpellis paucioribus et stylis longiorbus.—W. B. H.

Bush 2 m. high; primary branches erect, lateral branches spreading, glabrous, reddish, somewhat glaucescent; prickles on main shoots numerous, on secondary shoots in infrastipular pairs, yellowish, straight, sharp, 8–12 mm. long, base slightly dilated. *Leaves* shortly petiolate, 3–9-foliolate, including petioles 2–5 cm. long, 2–2·5 cm. broad; petiole 8–16 mm. long; leaflets shortly petiolulate, obovate, rarely oblong-obovate, 6–16 mm. long, 6–12 mm. broad, rounded, toothed, entire towards the cuneate base, dark green and glabrous above, pale green below with prominent silky-pubescent veins; rhachis with few prickles, and numerous short stipitate glands. *Stipules* adnate, rather over 1 cm. long, glandular-ciliolate; wings broad, free ends ovate or oblong-ovate, 4–6 mm. long, obtuse or acute. *Flowers* pink, 2·5–3 cm. across, in narrow terminal thyrsoid panicles; bracts very numerous, crowded, somewhat imbricate, tips recurved, lanceolate-ovate, 8–12 mm. long, shortly acuminate, remotely toothed in apical half, glandular-ciliolate; pedicels 0·5–2 cm. long, stipitate-glandular. *Calyx-tube* ellipsoid, 3–4 mm. long, stipitate-glandular; lobes ovate, rather over 1 cm. long, caudate-acuminate, slightly foliaceous, sparsely pubescent and clothed with many stipitate glands outside, very pubescent within. *Petals* orbicular, about 1·5 cm. in diameter, deeply emarginate. *Styles* about 12, long exserted, slender, pilose. *Fruit* globose, 6–8 mm. long, red, with few stipitate glands, crowned by erect persistent calyx-lobes. *Carpels* with apical tuft of yellowish setose hairs.

SZECHUAN. Min Valley, 2100 m., *Wilson*, 3531.

A singular species having a multitude of bracts crowded around the flowers. It is one of the constituents of the flora of the warm, dry Min Valley, between Mao-chou and Sungpan.—E. H. W.

Rosa (§ **Cinnamomeae**) **setipoda**, *Hemsl. et E. H. Wils.*; species inter affines inflorescentia maxima laxa, bracteis foliaceis et pedicellis setis longis patentissimis capitato-glandulosis instructis distincta.—W. B. H.

Bush 2–3 m. high; branches glabrous; prickles few, scattered, straight, dilated at base, or very short, blunt, and broadly dilated. *Leaves* shortly petiolate, 7–9-foliolate, including petioles 12–18 cm. long, 6–10 cm. broad; leaflets shortly petiolulate, elliptic or ovate, 4–6·5 cm. long, 2–3 cm. broad, rounded or acute, base often slightly oblique, deeply serrate, rarely biserrate, dark green, glabrous above; underside greyish green, glabrous, or clothed with short setiform glands, veins prominent, mid-rib more or less clothed with appressed silky hairs; petiolules glabrous or pubescent; leaf rhachis channelled above, with few scattered subulate prickles below, glabrescent, with few or many short setiform glands. *Stipules* adnate, 2–2·5 cm. long, entire, glabrous and prominently veined above; setosely glandular below; wings broad; free ends triangular, rather over 1 cm. long, 3–4 mm. broad, very acute. *Flowers* rose-pink, 4–6·5 cm. across, bracteate, borne in flat lax terminal corymbs 15–25 cm. across; bracts and bracteoles leafy, persistent, ovate, 1·5–2 cm. long, 8–10 mm. broad, acute, base cuneate, glandular-ciliolate; pedicels 2·5–4·5 cm. long, erect, clothed with spreading setose glandular hairs. *Calyx-tube* narrowly ovoid, constricted above, purplish, with few or many setose, glandular hairs; lobes ovate, 2·5–3 cm. long, caudate-acuminate, reflexed, apex foliaceous, toothed, glabrous or setosely glandular outside, densely pubescent within. *Petals* broadly-obovate or orbicular, 2 2·5 cm. broad, rounded emarginate, sparsely pubescent. *Styles* 12–20, shortly exserted, thickened upwards, more or less trigonous, pilose. *Fruit* red, ovoid, 2·5 cm. long, constricted above, crowned with the erect persistent calyx-lobes. *Carpels* 6 mm. long, glabrous.

HUPEH. Fang District at 2100–2400 m., *Wilson*, 2409*a*.

A remarkable rose, allied to *R. macrophylla*, with large corymbs of handsome flowers. Its long pedicels clothed with spreading gland-tipped bristles and numerous foliaceous bracts give it a singular appearance. The species is not uncommon in shrubberies in the Mts. of North-West Hupeh.—E. H. W.

Rosa (§ **Systylae**) **Sinowilsoni**, *Hemsl.*; species *R. moschatae* proxima, a qua differt omnibus partibus majoribus, ramis pedicellisque ruberrimis fere nudis, foliolis anguste ovato-oblongis usque ad 12 cm. longis, corymbis laxissimis, pedicellis elongatis, petalis fere orbicularibus basi cuneatis extus pubescentibus et fructu ellipsoideo.—W. B. H.

A rambling bush, 6 m. high; branches glabrous, reddish when young; prickles very sparse, short, hooked, dilated at base. *Leaves* 5- or 7-foliolate, including petioles 15–28 cm. long; leaflets shortly petiolulate, oblong or elliptic, 7–12 cm. long, 3–5 cm. broad, long acuminate, base rounded or oblique, sharply serrate

or biserrate, almost coriaceous, dark green, glabrous, somewhat rugose, pubescent; principal veins channelled above, very prominent below; petiole 5–10 cm. long, as well as the rhachis thick, reddish, glabrescent, channelled above, with several remote hooked prickles below; petiolules 2 mm. long, pubescent. *Stipules* adnate, 2–2·5 cm. long, free ends triangular, 4–6 mm. long, acuminate, serrate, pilose. *Flowers* white, 3–5·5 cm. across, erect, in large lax terminal corymbs, 20–25 cm. across; bracts oblong, acuminate, very deciduous; pedicels 2·5–5 cm. long, stout, reddish, glabrous, save for a few scattered stipitate glands. *Calyx-tube* ovoid, glabrous; lobes spreading, ovate, caudate, 2–2·5 cm. long, laciniate or entire, glabrous or pubescent outside, pubescent inside; laciniae remotely-toothed. *Petals* broadly obovate, 2–2·5 cm. long, 1·5–2 cm. broad, entire, rounded, base cuneate, pubescent outside. *Style* exserted rather over 1 cm., pilose; stigma clavate. *Fruit* ellipsoid, about 1·5 cm. long, red; calyx-lobes deciduous; style partially persistent.

Szechuan. Mt. Omi and mountains to the south, at 450–1200 m., *Wilson*, 4875, 3537*a*.

A very striking and distinct rose with large leaves, red petioles, peduncles and pedicels, very large lax corymbs and remarkably long pedicels. Though obviously allied to *R. moschata* it is very different from this and indeed from any other species.—E. H. W.

Rosa Moyesii, *Hemsl. et E. H. Wils.*; species *R. macrophyllae* proxima, a qua foliis patentibus aculeatis, foliolis creberrime denticulatis, floribus solitariis atropurpureis et fructu maximo cum calycis lobis erectis 6 cm. longo apice constricto differt.—W. B. H.

An erect bush, 2·5–3·5 m. high; branches glabrous with very few prickles; prickles short, straight, dilated at base. *Leaves* 7–13-foliolate, including the petioles 8–18 cm. long, 4–7·5 cm. broad; petioles 2–2·5 cm. long; leaflets subsessile, elliptic, rarely elliptic-lanceolate, 1·5–4 cm. long, 6–25 mm. broad, abruptly acute, regularly dentate-serrate, glabrous save midrib, which on under side is clothed with silky appressed hairs; rhachis pilose, with few or several straight subulate prickles, and numerous setose glands. *Stipules* adnate, 1·5–2 cm. long, purplish, wing broad, free ends deltoid, glandular-ciliolate. *Flowers* erect, solitary at the ends of short lateral shoots, very dark red, 5–6·5 cm. across, bracteate; bracts 1–2, oblong, acute, ciliolately glandular; peduncles 2–3 cm. long, naked or clothed with setose glands. *Calyx-tube* ovoid, naked or setosely glandular, purple; lobes spreading, oblong-ovate, 2–2·5 cm. long, caudate-acuminate, slightly foliaceous at apex, sparsely pubescent, often with few setose glands outside, very pubescent inside. *Petals* orbicular, 2–3 cm. broad, rounded, occasionally somewhat cuneate at base, slightly hairy outside. *Styles* 8, exserted, shorter than stamens, thickened upwards, more or less trigonous, pilose. *Fruit* red, ovoid, 3 cm. long, constricted above, and crowned by the persistent calyx-lobes which have become erect and enclose the stamens.

Szechuan. Tibetan frontier, chiefly near Tatien-lu, 2700–4000 m., *Pratt*, 172; 2100–2700 m., *Wilson*, 3543.

This species is not uncommon in shrubberies on the mountains between Mt. Omi and Tatien-lu, and its dark-red flowers are

singularly pleasing. Named in compliment to the Rev. J. Moyes, of the China Inland Mission, stationed at Tatien-lu, to whom I am much indebted for hospitality, assistance, and companionship on one long and interesting journey in Eastern Tibet.—E. H. W.

Rubiaceae

Randia acutidens, *Hemsl. et E. H. Wils.*; ab *R. densiflora* arcte affini differt imprimis cymis paucifloris et calycis limbo distincte lobulato lobulis acutissimis. *Diplospora* sp.? Hemsl. in Journ. Linn. Soc., vol. xxiii., p. 384.—W. B. H.

Bush or small tree 3 m. high. *Leaves* oblong-lanceolate, shortly petiolate, including petioles 10–15 cm. long, 2·5–5 cm. broad, acuminate, base cuneate, glabrous, coriaceous, dark-green above, brownish or pallid beneath; veins prominent on both surfaces; petioles 6–8 mm. long. *Stipules* triangular, acuminate, about 1 cm. long, deciduous. *Cymes* sessile, or subsessile, on leafless nodes, branched from the base; branches divaricate. *Flowers* 10–18, white, about 2·5 cm. across, pedicellate, bracteate; pedicels 3–6 mm. long; bracts small, scale like, acute. *Calyx* short, cupulate, toothed; teeth triangular, very acute. *Corolla-tube* 4 mm. long, cylindrical, glabrous outside, throat closed by a ring of silky hairs; lobes folded back, a little longer than the tube, ovate and bluntly acute, or oblong-ovate, mucronate. *Stamens* subsessile; anthers exserted, reflexed, nearly as long as corolla-lobes. *Style* straight, stout, exserted about 1 cm.; ovary glabrous. *Berry* globular, the size of a small pea, black, many-seeded. *Seeds* ovoid.—E. H. W.

Szechuan. *Henry*, 8924; *Pratt*, 377; hills around Kiating, *Wilson*, 4093, 4423.

Campanulaceae.

Pentaphragma sinense, *Hemsl. et E. H. Wils.*; *P. begoniifolio* proximum, differt habitu, foliis minus inaequilateralibus integris, floribus majoribus et sepalis petala aequantibus.—W. B. H.

Herb with short horizontal stem. *Leaves* obliquely-ovate, including petiole 12–22 cm. long, 7–10 cm. broad, entire, obtuse, base cuneate, or excised on one side, dark-green, glabrous above, pale, scabrid-puberulous below; petioles 4–5 cm. long, fleshy, scabrid. *Flowers* white, 8 mm. broad, erect in lateral scorpioid cymes 5–7·5 cm. long; peduncles 2–3 cm. long, stellately-pubescent; bracts obovate, 8–10 mm. long, 4 mm. broad, rounded, stellately-puberulous; pedicels 2 mm. long. *Calyx-tube* very short; lobes suberect, oblong-obovate, 7–8 mm. long, rounded, stellately hairy, persistent. *Corolla* campanulate, 8–10 mm. long, deeply 5-lobed; lobes erect, oblong-ovate, persistent; apices inflexed, apiculate, bearded. *Stamens* half length of corolla; filaments flattened; anthers linear-oblong, apiculate. *Style* short, thick; stigma peltate, obscurely-lobed; ovary 8–10 mm. long, campanulate, ribbed, stellately puberulous; ribs narrowly winged.

Chino-Tonking Frontier. Laokai, moist shady banks of ravines, August, 1899, *Wilson*, 2787.

The flowers of this plant are exceedingly mucilaginous.—E. H. W.

PRIMULACEAE.

Lysimachia Wilsoni, *Hemsl.*; habitu et adspectu *L. ramosae* simillima, ab ea tamen pedunculis saepissime plurifloris, floribus fere duplo majoribus et calycis lobis fere orbicularibus abrupte acuminatis differt.—W. B. H.

Herb 30–45 cm. high, erect, glabrous, branching only from the very base. *Stems* angular, winged. *Leaves* alternate, elliptic to elliptic-lanceolate, including the petiole 9–14 cm. long, 2·5–5 cm. broad, acuminate, entire or very obscurely toothed, membranous; veins prominent; petioles 2–3 cm. long, winged. *Flowers* yellow, 1·5–2·5 cm. across, erect, in lax axillary racemes, or in axils of uppermost leaves solitary; peduncles suberect, 2–4 cm. long, angular, 3–5-flowered; bracts leafy, ovate, 8–12 mm. long, acuminate; pedicels filiform, spreading, 2–3 cm. long. *Sepals* nearly orbicular, 2–4 mm. long, acuminate. *Corolla* rotate; lobes spreading, oblong-elliptic, 8–12 mm. long. *Filaments* exceedingly short, united at base, forming a cup-shaped disk around ovary; anthers 4 mm. long, conniving, auricled. *Pistil* 6–8 mm. long, exceeding the stamens; style subulate; stigma simple.

SZECHUAN. Mt. Omi, rare, *Wilson*, 5061.

This is possibly the same as Franchet's *L. ramosa*. var. *grandiflora*, in Journ. de Bot. ix. (1895), p. 464—a plant collected in Yunnan by Père Delavay. If this is so the varietal name cannot stand in view of *L. grandiflora*, Nuttall.—E. H. W.

STYRACACEAE.

Symplocos Wilsoni, *Hemsl.*; ut videtur ex affinitate *S. stellatae* (species mihi ignotae) a qua foliis utrinque cuneatis, fasciculis multifloris, petalis supra medium ciliolatis et staminibus quam petalis dimidio longioribus differt.—W. B. H.

Tree 7 m. high, evergreen; younger branches densely clothed with short reddish-brown indumentum. *Leaves* oblong-lanceolate, including petiole 10–12 cm. long, 2–2·5 cm. broad, acute, base cuneate, margins revolute, glabrous, coriaceous, shining above, paler below; lateral nerves alternate, distant, prominent on upper surface, obscure on underside; petioles angular, rather over 1 cm. long, rusty-pubescent when young. *Flowers* about 1 cm. across, greenish-yellow, in nearly sessile clusters in the axils of fallen leaves on previous year's shoots; pedicels very short, pilose; bracteoles 3, imbricate, broadly-obovate or orbicular, 2 mm. long, ciliate, sparsely pilose. *Calyx* 1 mm. long, cup-shaped; lobes rounded, ciliate. *Petals* free, imbricate, erect, oblong-ovate or obovate, 6–8 mm. long, rounded, ciliolate, concave. *Stamens* about 20, slightly exceeding the petals; filaments flattened. *Disk* annular. *Pistil* a little longer than stamens; style persistent, at least for a considerable time; ovary glabrous.—E. H. W.

SZECHUAN. Woods at 1200–1800 m., *Wilson*, 4067.

Styrax Veitchiorum, *Hemsl. et E. H. Wils.*; species ex affinitate *S. Hemsleyanae* et *S. odoratissimae*, a priore differt foliis lanceolatis calycis dentibus minutis, et staminibus petala aequantibus, a posteriore floribus in ramis lateralibus numerosissimis,

calyce parvo crasso densissime albo-tomentoso denticulato (non truncato fisso) et filamentis quam antheris longioribus recedit.—W. B. H.

Small tree 4–5 m. high; young branches stellately pubescent. *Leaves* lanceolate-ovate, including the petioles 7–11 cm. long, 2·5–4·5 cm. broad, acuminate, base rounded or cuneate, remotely toothed, membranous, venation prominent on underside with tufts of stellate hairs in the axils of principal veins. *Flowers* white, 2–2·5 cm. across, in axillary and terminal cymes, either racemose or fascicled, on lateral branches 7–20 cm. long, of the current year's growth; the whole shoot forming a narrow leafy panicle; peduncles 3–10-flowered, stellately pubescent; pedicels slender, rather over 1 cm. long, pubescent. *Calyx* cup-shaped, 2–3 mm. long, minutely 5-toothed, with short white dense stellate pubescence on both surfaces. *Corolla-tube* 2 mm. long; lobes spreading, 8–10 mm. long, ovate or elliptic-ovate, obtuse or subacute, pubescent. *Stamens* as long as corolla-lobes; filaments flattened, pilose; anthers 4–5 mm. long. *Pistil* equalling the stamens in length, tomentose.—E. H. W.

HUPEH. Fang district, forest at 2100–2400 m., only once seen, *Wilson*, 2015.

Styrax confusa, *Hemsl.*; species distincta, olim (Journ. Linn. Soc., vol. xxvi., p. 77) cum *S. odoratissima* fallaciter juncta, a qua foliis coriaceis breviter petiolatis, floribus saepius in paniculas parvas terminales dispositis, calyce denticulato, petalis crassis intus nudis, filamentis brevibus barbatis et stylo fere glabro differt.

KWANTUNG. Lantao Island, Mr. Ford's native collector, May, 1888.

Alniphyllum megaphyllum, *Hemsl. et E. H. Wils.*; ab *A. pterospermo* foliis majoribus usque ad 20 cm. longis et 10 cm. latis, pilis stellatis brevioribus, pedicellis subcapsulis abrupte deflexis et seminum alis latioribus recedit.—W. B. H.

Tree 6 m. high. *Leaves* broadly ovate, rarely obovate, including the petioles 15–20 cm. long, 6–10 cm. broad, shortly acuminate regularly or remotely serrate, dark green and sparsely stellately hairy above, pale green or glaucous and clothed with short stellate hairs beneath; petiole 1–1·5 cm. long. *Panicles* narrow, axillary, 15 cm. long, borne on preceding year's growth; pedicels 8–10 mm. long, sharply deflexed towards axis. *Capsule* dark brown, somewhat pentagonal, oblong, rather under 2 cm. long, beaked, with few short stellate hairs. *Seeds* 7–10 mm. long.

HUPEH. Changyang at 1500–2100 m., *Wilson*, 2686, 2685.

An interesting addition to this recently-established genus. Unfortunately both specimens are in ripe fruit, and the flowers are unknown. The tree is rare, and was only met with in the forest to the south-west of Ichang.—E. H. W.

APOCYNACEAE.

Vallaris grandiflora, *Hemsl. et E. H. Wils.*; *V. Heynei* proxima, a qua foliis supra medium latioribus, cymis subtrifloris, floribus fere triplo majoribus et corollis intus albo-pilosis differt.—W. B. H.

Twining shrub with pale grey bark. *Leaves* ovate or obovate, including petiole 8–11 cm. long, 4–5 cm. broad, acuminate, nearly glabrous above, pubescent below; petioles 4–8 mm. long. *Flowers* in shortly pedunculate axillary fascicles of 3, pale yellow, 4 cm. across, pedicellate; pedicels 1–1·5 cm. long, pubescent. *Sepals* oblong-ovate, rather over 1·5 cm. long, acute, pubescent. *Corolla-tube* 8 mm. long, glabrous outside; limb spreading, pubescent, lobed rounded, apiculate. *Anthers* exserted; filaments short, pilose. *Pistil* over 1 cm. long; ovary and style pilose; stigma oblique. *Disk* green, cup-shaped, ciliate toothed.

SZECHUEN. Tung Valley, at about 700 m., *Wilson*, 4108.

A showy climber with flowers much larger than in other members of the genus. It is rather rare, being met with only in the dry warm valley of the Tung river.—E. H. W.

SALICACEAE.

Salix magnifica, *Hemsl.*; species distinctissima undique glaberrima, foliis maximis cum petiolo pollicari circiter 22·5 cm. longis et 15 cm. latis, amentis masculis absque pedunculo brevi usque ad 10 cm. longis, femineis 20 cm. longis, florum masculorum glandula antica magna carnosa 2- vel 3-lobata.

A shrub about two metres high, glabrous in all parts. *Branches* straight, dark purple in the dried state, and sparingly lenticellate. *Leaves* almost coriaceous when mature, pale below, those of the sterile branches elliptical or obovate, the largest, including the petiole, about 22·5 cm. long by 15 cm. broad, abruptly and obtusely acuminate, rounded at the base; primary veins 12 to 15 on each side of the midrib, slightly curved; those on flowering branches relatively small, crowded, obovate or oblong, smaller downwards and lowermost scale-like. *Male catkins* shortly stalked, including stalk 10 to 12 cm. long, horizontal or ascending. *Flowers* diandrous. *Female catkins* 20 cm. long, apparently erect. *Capsule* two-valved, valves recurved.

WESTERN SZECHUAN. Mountains, at about 2700 m., *Wilson*, 4526.

A very remarkable species, having large, broad leaves, more like those of a poplar than of a willow, and very long catkins. Only two plants were seen by Mr. Wilson.—W. B. H.

XXVI.—DIAGNOSES AFRICANAE: XVII.

841. **Helichrysum argyrocephalum**, *C. H. Wright* [Compositae-Inuloideae]; ex affinitate *H. Guilelmi*, Engl., et *H. Volkensii*, O. Hoffm., differt foliis basi auriculatis, indumento non arachnoideo.

Caulis fruticosus, teres, viscide pubescens. *Folia* anguste lanceolato-acuminata, acuta, 5 cm. longa, 4 mm. lata, integra, utrinque hirsuta, basi late auriculata (1 cm. lata); costa supra impressa, subtus prominens. *Capitula* corymbose disposita,

2 cm. diam. ; bracteae argenteo-nitidae, lanceolatae, 8 mm. longae, 2 mm. latae, acutae, paleaceae, obscure serratae. *Flores* 3 mm. longi.

Tropical Africa. Uganda Protectorate : Nandi, 1800–2400 m., *Johnston*.

842. **Helichrysum retortoides**, *N. E. Brown* [Compositae-Inuloideae] ; affine *H. retorto*, Thunb., sed ramis brevioribus erectis confertis, foliis angustioribus confertioribus, capitulis minoribus et indumento differt.

Planta 7–10 cm. alta. *Rami* erecti, conferti, simplices vel superne parce ramosi, lignosi, graciles, usque ad apices dense foliosi. *Folia* 5–8 mm. longa, 1·5–2 mm. lata, lineari-oblonga, obtusa, supra indumento argenteo-coactili vestita vel subglabra, subtus dense albo-tomentosa. *Capitula* solitaria, sessilia, 2–2·5 cm. longa, cylindrica. *Involucri* squamae pluriseriatae, glabrae ; exteriores ovatae vel lanceolatae, subacutae, rubrae ; interiores longiores, lineari-lanceolatae, obtusae, albae. *Flores* lutei, involucro duplo breviores. *Corolla* 7 mm. longa, filiformi-tubulosa, brevissime 5-dentata. *Ovarium* minutissime papillatum. *Pappi* setae apice breviter barbellatae.

Natal. On the slopes of the Drakensberg, 1800–2100 m., *Wilson in Herb. Wood*, 8265.

843. **Aspilia vulgaris**, *N. E. Brown* [Compositae-Helianthoideae] ; affinis *A. zombensi*, Baker, sed foliis minoribus, involucri bracteis latioribus, floribus luteis nec aurantiacis differt.

Herba perennis, 30–60 cm. alta. *Caules* erecti, ramosi, scabrido-pubescentes. *Folia* opposita, brevissime petiolata, 1·5–4·5 cm. longa, 1–2·5 cm. lata, ovata, acuta, basi late rotundata vel subcordata, acute serrata, utrinque scabrida. *Pedunculi* 1·5–4 cm. longi (vel ultra ?), scabrido-pubescentes. *Involucri* bracteae 3-seriatae, 5–7 mm. longae, 2 mm. latae, lineari-oblongae, acutae, scabridae. *Squamae* receptaculi rigidae, convolutae, acutissime acuminatae, glabrae. *Corolla* radii 1–1·5 cm. longa, 4–6 mm. lata, lutea, subtus minutissime glanduloso-puberula ; disci 5 mm. longa, tubulosa, 5-dentata, glabra, lutea. *Ovarium* radii glabrum, disci pubescens, pappo cupulari lacerato-fimbriato coronatum.

Rhodesia. Mashonaland : very common between Umtali and Salisbury, *Hon. Mrs. Evelyn Cecil*, 43.

844. **Lobelia Johnstoni**, *C. H. Wright* [Campanulaceae-Lobelieae] ; ex affinitate *L. coronopifoliae*, L., differt corollae loborum circumscriptione coloreque.

Caulis 3 mm. diam., suffruticosus, plus minusve decumbens ; rami erecti, virgati, glabri. *Folia* oblanceolata vel fere linearia, obtusa, parce irregulariterque dentata, glabra, 1·5 cm. longa, 2 mm. lata. *Racemi* pauciflori ; bracteae parvae, subulatae ; pedicelli demum 8·5 cm. longi, appresse strigosi. *Calycis* tubus turbinatus, basi acutus, extus appresse strigosus ; lobi 2·5 mm. longi, lineari-lanceolati, acuti, ciliati. *Corolla* roseo-purpurea ; tubus 7 mm. longus ; lobi superiores lanceolato-falcati, acuti, laterales ovati, obtusi, infimus caeteris longior, obtriangularis. *Stamina* 8 mm.

longa ; filamenta plana, costa conspicua ; antherae omnes pluma brevi alba terminatae. *Stylus* staminibus paullo brevior. *Semina* 1 mm. longa, ovoidea, trigona.

Tropical Africa. Uganda Protectorate : Nandi Plateau, *Johnston*.

845. **Cyphia alba**, *N. E. Brown* [Campanulaceae-Cyphieae] ; affinis *C. persicifoliae*, Presl., sed floribus multo minoribus facile distinguitur.

Caulis erectus, tortuosus (vel subscandens ?), 2 mm. crassus, glaber, supra medium aphyllus. *Folia* pauca, alterna, patentia, sessilia, 7·5-9·5 cm. longa, 4–6 mm. lata, linearia, acuta, serrulata, complicata, glabra. *Racemus* terminalis, 4·5 cm. longus, longissime pedunculatus, pluriflorus, spiraliter tortus. *Bracteae* 4–6 mm. longae, lineares, acutae, denticulatae. *Bracteolae* 3 mm. longae, lineares, acutae. *Pedicelli* 2–3 mm. longi, puberuli. *Calyx* 5-lobus ; tubus late obconicus, 1·5 mm. longus, dense puberulus ; lobi 2·5–3 mm. longi, lineares, acuti, patulo-erecti, dorso tenuiter puberuli. *Corolla* parva, alba ; petala 5–6 mm. longa, 1·5–2 mm. lata, spathulato-ovata, acuta. *Antherae* oblongae, apice minute barbatae.

British Central Africa. Rhodesia : Manika district, north of Umtali, *Evelyn Cecil*, 163.

846. **Wahlenbergia mashonica**, *N. E. Brown* [Campanulaceae-Campanuleae] ; affinis *W. Ecklonii*, Buek, sed floribus minoribus et sepalis quam tubo corollae multo brevioribus differt.

Herba 15–25 cm. alta, omnino glabra. *Caules* graciles, superne laxe corymboso-ramosi. *Folia* parva, 3–7 mm. longa, 0·5–0·7 mm. lata, linearia, acuta, marginata, minute denticulata. *Flores* sparsi, parvi. *Pedicelli* 6–10 mm. longi, subcapillares. *Calyx* 5-lobus ; tubus late obconicus, 1 mm. longus, demum 1·5 mm. longus ; lobi 1·5 mm. longi, distantes, subulati, acuti, erecti. *Corolla* campanulata, 5-loba, caerulea ; tubus 3 mm. longus, 2·5 mm. diam. ; lobi 2 mm. longi, ovati, acuti. *Capsula* semisupera vel fere supera, 3-valvis, 2·5 mm. longa.

Rhodesia. Mashonaland : between Salisbury and Headlands, *Hon. Mrs. Evelyn Cecil*, 157.

847. **Carissa Wyliei**, *N. E. Brown* [Apocynaceae-Carisseae] ; affinis *C. grandiflorae*, A. DC., sed habitu graciliore, foliis tenuioribus et lobis corollae acutis differt.

Frutex dichotome ramosus, ubique corollae tubo excepto glaber. *Rami* graciles, 1·5–3 mm. crassi ; spinae brevissimae vel nullae, simplices vel furcatae, 1–2 mm. longae. *Folia* breviter petiolata, 5–8 cm. longa, 2·5–4·5 cm. lata, ovata vel lanceolata, acutissima, basi cuneata vel rotundata ; petiolus 2–3 mm. longus. *Cymae* terminales, subsessiles, 5–6-florae. *Pedicelli* 4–6 mm. longi. *Sepala* 2·5–3 mm. longa, deltoideo-subulata, acutissima. *Corollae* tubus 1·2 cm. longus, 1·5 mm. diam., cylindricus, intra pubescens ; lobi 1·2–1·5 cm. longi, 4 mm. lati, lanceolati, acuti, patentes.

Natal. Zululand District : Ngoya, 300–600 m., *Wylie in Herb. Wood*, 7898.

848. **Trichocaulon Alstoni**, *N. E. Brown* [Asclepiadaceae-Stapelieae] ; affine *T. pilifero*, N. E. Brown, sed floribus campanulatis flavis et pedicellis longioribus differt.

Caulis 15 cm. altus, 4 cm. crassus vel ultra, multiangularis, glaber ; anguli spinoso-tuberculati, spinis 6–10 mm. longis. *Flores* inter angulos caulis versus apicem fasciculati. *Bracteae* minutae, subulatae. *Pedicelli* 3–4 mm. longi, glabri. *Sepala* erecta, 3 mm. longa, 1·5 mm. lata, ovata, acuminata, glabra. *Corolla* campanulato-infundibuliformis, glabra, flava ; tubus 4–5 mm. longus ; lobi 4–5 mm. longi, ovati, peracuti. *Corona exterior* breviter cupularis, aequaliter 10-dentata, glabra ; dentes deltoideo-oblongi, obtusi. *Coronae interioris* lobi oblongi, obtusi, antheris incumbentes.

Cape Colony. Little Namaqualand : in stony fields near Namies, 900 m., *Alston in MacOwan, Herb. Austr.-Afr.*, 2017.

849. **Ipomoea Cecilae**, *N. E. Brown* [Convolvulaceae-Convolvuleae] ; affinis *I. commatophyllae*, A. Rich., sed lobis foliorum linearibus et floribus triplo majoribus differt.

Planta herbacea 45–60 cm. diam. *Rami* prostrati, pubescentes. *Folia* petiolata ; petiolus 1–2 cm. longus, pubescens ; lamina profunde et inaequaliter trifida, basi cuneato-acuta, utrinque leviter puberula ; lobus intermedius 2–3 cm. longus, 4 mm. latus, linearis, acutus vel subobtusus ; lobi laterales 0·5–2 cm. longi, 2–2·5 mm. lati, erecto-patentes, lineares, acuti. *Flores* axillares, solitarii. *Pedunculus* 1–2 cm. longus, medio bibracteatus, pubescens. *Bracteae* vix 1·5 cm. longae, erectae, filiformes, pubescentes. *Sepala* vix 1·5 cm. longa, 5–6 mm. lata, ovata, longe acuminata, erecta, puberula. *Corolla* purpureo-rosea, glabra ; tubus 2·5 cm. longus, apice vix 1·5 cm. diam. ; limbus 5 cm. diam. *Stigma* 2-globosum.

Rhodesia. Mashonaland : near Umtali, *Hon. Mrs. Evelyn Cecil*, 36.

850. **Dyschoriste matopensis**, *N. E. Brown* [Acanthaceae-Ruellieae] ; affinis *D. Fischeri*, Lindau, sed foliis minutissime et tenuissime puberulis nec molliter pubescentibus, venis obscuris et floribus minoribus roseo-albis nec luteis differt.

Frutex parvus, ramosus, ubique minutissime puberulus, cortice cinereo. *Folia* opposita, parva, breviter petiolata, 6–12 mm. longa, 3–6 mm. lata, lanceolata, obovata vel anguste elliptica, obtusa, basi cuneata, subcoriacea, venis obscuris, utrinque parce et minutissime puberula. *Flores* axillares, solitarii, brevissime pedicellati, bibracteati. *Bracteae* 1–2 mm. longae, obovatae. *Calyx* tubulosus, 5-dentatus ; tubus 6–7 mm. longus ; dentes 3–4 mm. longi, subulati. *Corolla* subaequaliter 5-loba, roseo-alba ; tubus 2 cm. longus, anguste cylindricus ; lobi 5–6 mm. longi, 2·5 mm. lati. *Stamina* 4 ; antherae lineares, aequales.

Rhodesia. Matabeleland : Matopo Mountains, *Hon. Mrs. Evelyn Cecil*, 114.

851. **Orthosiphon dissimilis**, *N. E. Brown* [Labiatae-Ocimoideae] ; affinis *O. Hildebrandtii*, Baker, sed foliis acutioribus et calycibus longioribus recedit.

Herba erecta, 30–45 cm. alta. *Caulis* puberulus, 2 mm. crassus. *Folia* distantia, petiolata; petiolus 1–2 cm. longus; lamina 3–5 cm. longa, 2–3 cm. lata, ovata, acuta vel subacuta, dentata, basi cuneato-acuta, supra viridis, fere glabra, subtus subglauca. *Verticillastri* numerosi, distantes, 6–8-flori. *Bracteae* 2–4 mm. longae, obovatae, obtusae vel subapiculatae, reflexae. *Pedicelli* 3–6 mm. longi, puberuli. *Calyx* 5-dentatus, purpureus, parce pubescens; tubus 5 mm. demum 8 mm. longus, tubulosus, leviter curvatus; dens superior 2 mm. longus, orbicularis, obtusus; dentes laterales 1·5 mm. lati, deltoideo-subulati; inferiores 2·5–3 mm. longi, setiformes. *Corolla* pallide purpurea, puberula; tubus exsertus, vix 1 cm. longus, leviter curvatus; labium superius 3·5–4 mm. longum, subaequaliter 4-lobum; labium inferius 3–4 mm. longum, complicatum, obtusum. *Stamina* libera, 2 mm. longa, exserta.

Portuguese East Africa. By the Railway between Beira and Massi Kessi, *Hon. Mrs. Evelyn Cecil*, 20.

852. **Plectranthus selukwensis**, *N. E. Brown* [Labiatae-Ocimoideae]; affinis *P. sphaerophyllo*, Baker, sed foliis basi subtruncatis et floribus minoribus differt.

Herba 23–30 cm. alta, ubique plus minusve puberula vel pubescens. *Folia* patentia; petiolus 1–3 cm. longus; lamina 1·5–2 cm. longa, 1·5–2·5 cm. lata, latissime deltoidea, acuta, grosse dentata, basi subtruncata. *Verticillastri* 4–6-flori, subdistantes. *Bracteae* minutae, late ovatae. *Pedicelli* 2 mm. longi. *Calyx* 2·5 mm. longus, ad medium 5-dentatus; dens superior ovatus, subobtusus; dentes inferiores deltoidei, acuti. *Corolla* vix ultra 1 cm. longa, caeruleo-purpurea, glanduloso-punctata; tubus medio abrupte subincumbente-reflexus; labium superius 5 mm. longum, breviter et obtuse 4-lobum; inferius 6 mm. longum, cymbiforme, obtusum, intra hirsutum.

Rhodesia. Matabeleland: common at Selukwe, *Hon. Mrs. Evelyn Cecil*, 123.

853. **Coleus scaposus**, *C. H. Wright* [Labiatae-Ocimoideae]; ad *C. Penzigii*, Schweinf., accedit; pedicellis elongatis, labio antico corollae apice incurvo tomentoque velutino differt.

Radix perennis, lignosus, 8 mm. crassus. *Folia* late oblanceolata, obtusa, 5 cm. longa, 2 cm. lata, basi in petiolum 1 cm. longum attenuata, crenata. *Inflorescentia* scaposa, indivisa; verticillastri ad 12-flori; bracteae ovatae, 2 mm. longae; pedicelli ad 1·5 cm. longi, rufo-velutini. *Calyx* 4 mm. longus, extus pilosus; segmentum posticum ovatum, reliqua subulata. *Corolla* 1·7 cm. longa, extus pubescens; labium anticum 1·2 cm. longum, naviculare, apice incurvum; posticum 5 mm. longum, rotundatum. *Filamenta* ad medium connata. *Nuculae* compressae.

British Central Africa. Nyasaland: Namasi, *Cameron*, 60.

854. **Walafrida Cecilae**, *Rolfe* [Selagineae]; affinis *W. paniculatae*, Rolfe, sed sepalis longioribus et angustioribus, corolla angustiore recedit.

Fruticulus ramosissimus, "30–60 cm. altus." *Rami* cinereo-puberuli. *Folia* saepissime fasciculata, lineari-oblonga, obtusa,

integra, puberula vel hispidula, 2–4 mm. longa. *Capitula* multiflora, numerosissima, in paniculam laxam plus minusve elongatam disposita. *Bracteae* oblongae, obtusae, puberulae vel hispidulae, 1·5 mm. longae. *Calyx* bipartitus, 1 mm. longus ; sepala oblonga, obtusa, minute ciliata, membranacea, oblique uninervia. *Corolla* "alba," 2 mm. longa, tubo oblongo, lobis inaequalibus orbicularibus. *Fructus* late orbiculari-ovoideus, 1 mm. longus.

RHODESIA. Near Bulawayo, *Hon. Mrs. Evelyn Cecil.*

This has the habit and general appearance of the S. African *Walafrida paniculata*, Rolfe (*Selago paniculata*, Thunb.), but is markedly different in the details of the minute flowers.

855. **Loranthus Cecilae**, *N. E. Brown* [Loranthaceae-Eulorantheae] ; affinis *L. Molleri*, Engl., sed foliis minoribus cordatis obtusis glaucis differt.

Rami pubescentes. *Folia* opposita, petiolata ; petiolus 3–6 mm. longus, pubescens ; lamina 1·5–3·5 cm. longa, 1·5–2·5 cm. lata, cordato-ovata, obtusa, utrinque glabra, glauca. *Cymae* subsessiles, axillares, 4–7-florae. *Pedicelli* 2 mm. longi, puberuli. *Bractea* oblique cupuliformis, acuta, puberula. *Calycis* puberuli limbus brevissimus, cupuliformis, truncatus. *Corolla* 3–3·5 cm. longa, viridi-lutea, apice coccinea, pubescens, recta, supra basin pentagono-globosam constricta, ultra medium lateraliter fissa, apice 5-loba ; lobi anguste lineari-lanceolati, acuti. *Stamina* 5 ; filamenta 6 mm. longa, linearia, apice in dentem brevem producta, glabra ; antherae 2 mm. longae. *Stylus* gracilis, prope apicem leviter fusiformi-incrassatus, pentagonus ; stigma subglobosum.

RHODESIA. Matabeleland : near Bulawayo Waterworks, *Hon. Mrs. Evelyn Cecil*, 96.

856. **Loranthus virescens**, *N. E. Brown* [Loranthaceae-Eulorantheae] ; affinis *L. Dregei*, Eckl. et Zeyh., sed foliis bracteis et indumento differt.

Rami novelli dense stellato-tomentosi. *Folia* opposita, stellato-tomentosa ; petiolus 4–6 mm. longus ; lamina 2·5–4·5 cm. longa, 1·5–2·5 cm. lata, elliptica vel elliptico-ovata, obtusissima, basi rotundata. *Cymae* axillares, longe pedunculatae, 4-florae. *Pedunculus* 1·5–2·5 cm. longus, stellato-tomentosus. *Pedicelli* 1–2 mm. longi, stellato-tomentosi. *Bractea* 5 mm. longa, 2 mm. lata, lineari-lanceolata, obtusa, supra glabra, subtus stellato-tomentosa. *Calyx* 2·5 mm. longus, appresse tomentosus ; limbus subnullus. *Corolla* 5 cm. longa, ad $\frac{2}{3}$ in lobos 5 lineares acutos divisa, virescens, extra pilis minutis stellatis cum pilis longis intermixtis dense obtecta ; tubus 1·7 cm. longus, basi ovoideo-inflatus ; lobi 3·5 cm. longi, prope apicem 1·5 mm. lati. *Stamina* 5, glabra ; filamenta 2 cm. longa, filiformia, apice edentata ; antherae 8 mm. longae, lineares, acutae, cum filamento continuae. *Stylus* gracilis ; stigma leviter clavatum.

RHODESIA. Mashonaland : Six-mile Spruit near Salisbury, *Hon. Mrs. Evelyn Cecil*, 147.

857. **Schizochilus Cecili**, *Rolfe* [Orchidaceae-Ophrydeae] ; facies fere *S. Bulbinellae*, differt labello valide trilobo basi tricalloso.

Folia subradicalia, circa 5, lanceolato-oblonga, acuta, 5–7·5 cm. longa, subconduplicata, 1–2 cm. lata. *Scapus* circa 25 cm. altus, apice vaginis lanceolatis obtectus; spica cylindrica, multiflora; bracteae ovato-lanceolatae, acuminatae, 4–6 mm. latae; pedicelli 3 mm. longi. *Sepala* late ovata, subobtusa, 2·5 mm. longa. *Petala* late ovata, subobtusa, 1-nervia, 1·5 mm. longa. *Labellum* 2·5 mm. longum, 2 mm. latum, trilobum, trinervium, basi tricallosum, lobis lateralibus brevilus latis subobtusis, lobo intermedio late triangulari-ovato subobtuso, callis oblongis carnosis obtusis. *Columna* brevissima.

Rhodesia. Manika: Inyanga Mountains, 1800–2100 m., *E. Cecil*, 202.

An interesting member of a small genus which has hitherto only been known from extra-tropical South Africa. The flowers are noted as bright yellow.

858. **Kaempferia Cecilae**, *N. E. Brown* [Scitamineae-Zingibereae]; affinis *K. roseae*, Schweinf., sed foliis anguste lineari-lanceolatis facile distinguitur.

Folia erecta, anguste lineari-lanceolata, acutissima, basi acuta, glabra; petiolus 7·5–10 cm. longus; lamina 25–35 cm. longa, 2·5–3 cm. lata. *Racemi* 15–25 cm. longi, angusti, pluriflori, ubique glabri. *Bracteae* 2–2·5 cm. longae, vel infimae interdum ad 5 cm. longae, oblongo-lanceolatae, subacutae, subconvolutae. *Pedicelli* 0·5–2·5 cm. longi. *Ovarium* angustum, 6–11 mm. longum. *Calyx* campanulatus, subtruncatus, 4–6 mm. longus. *Petala* 2–2·5 cm. longa, 5–6 mm. lata, lanceolata, acuta, membranacea. *Labellum* 4·5–5 cm. longum et latum, suborbiculare, bifidum, pallide purpureo-roseum, immaculatum. *Staminodium* laterale 2·5 cm. longum, 6–7 mm. latum, cuneato-oblanceolatum, obtusum, emarginatum, pallide purpureo-roseum.

Portuguese East Africa. In the swamps at Dondo, near Beira, *Hon. Mrs. Evelyn Cecil*, 248.

859. **Lapeyrousia rhodesiana**, *N. E. Brown* [Iridaceae-Ixieae]; affinis *L. Welwitschii*, Baker, sed ramis angulatis, floribus majoribus, perianthii segmentis multo latioribus et styli ramis bifidis differt.

Herba 25–40 cm. alta, glabra. *Caulis* superne corymboso-ramosus, angulatus. *Folia* 3–4, erecta, linearia, acuta, 7·5–25 cm. longa, 1·5–5 mm. lata. *Corymbus* 7·5–25 cm. diam., sublaxus, ramulis angulatis, 2–3-floris. *Spathae* 4–5 mm. longae, late oblongae, obtusae, apiculatae, membranaceae, multinerves, brunneae. *Perianthium* caeruleum; tubus 8–10 mm. longus, angustissime infundibuliformis; lobi aequales, 8–9 mm. longi, 3·5–4·5 mm. lati, oblongi vel elliptico-oblongi, subacuti vel obtusi. *Antherae* lineares, 3·5 mm. longae. *Stylus* exsertus, apice trifidus, ramis bifidis.

Rhodesia. Mashonaland: at Headlands, between Salisbury and Umtali, on flat ground, *Hon. Mrs. Evelyn Cecil*, 154.

860. **Gladiolus bellus**, *C. H. Wright* [Iridaceae-Ixieae]; *G. blando*, Ait., valde affinis, perianthii tubo multo longiore differt.

Caulis erectus, teres, glaber vel minute pubescens. *Folia* 45 cm. longa, 7 mm. lata, linearia, longe acuminata, glabra, circa 10-nervia, nervis marginalibus incrassatis. *Pedunculus* 40 cm. altus, supra medium unibracteatus. *Racemus* 15–25 cm. longus, floribus 8–10, distantibus. *Spathae* e basi ovata lanceolatae, rubrotinctae, exteriores 5–5·5 cm. longae, interiores circa 4 cm. longae. *Perianthii* tubus 5·5 cm. longus, 2 mm. diam., abrupte curvatus, apice leviter infundibuliformis; segmenta obovata, obtusa, 4–5 cm. longa, 1·2–2·5 cm. lata, alba, area deltoidea purpureostriata. *Stamina* 2·5–3 cm. longa. *Capsula* oblonga, obtusa, circa 1·7 cm. longa.

British Central Africa. Nyasaland: Zomba Plateau, *Whyte;* Mlanji, 1800 m., *Mahon;* Tuchila Plateau, 1800 m., *Purves*, 4.

861. **Chlorophytum asphodeloides**, *C. H. Wright* [Liliaceae-Asphodeleae]; a *C. pubiflore*, Baker, floribus glabris differt.

Herba 30 cm. alta. *Folia* lineari-lanceolata, longe acuminata, circa 25 cm. longa, 1 cm. lata, glaberrima, compacte 20-nervia, marginibus integris, laevibus. *Scapus* teres, 2 cm. altus, paniculatim ramosus; bracteae approximatae, lanceolatae, acuminatae, ultra 1·5 cm. longae, nervis prominentibus, marginibus acumineque albo-scariosis; bracteolae ovatae, 3 mm. longae; flores 2–3-fasciculati. *Perianthium* album, ultra 1 cm. diam.; segmenta oblonga, obtusa, 2 mm. lata, medio trinervia. *Filamenta* 3·5 mm. longa, complanata; antherae oblongae, obtusae, 1·5 mm. longae. *Ovarium* oblongum; stylus filiformis. *Capsula* 5 mm. longa, 4 mm. lata, profunde trilobata, marginibus incrassatis. *Semina* nigra, compressa, suborbicularia, 2 mm. diam., laevia.

British Central Africa. Nyasaland: Tuchila Plateau, Mlanji, 1800 m., *Purves*, 18.

862. **Chlorophytum glabriflorum**, *C. H. Wright* [Liliaceae-Asphodeleae]; *S. pubiflorum*, Baker, simulans, floribus glabris differt.

Herba glabra, circa 1 m. alta. *Folia* lineari-lanceolata, 35 cm. longa, vix ultra 1·5 cm. lata, compacte 30-nervata, minute papillosa, marginibus cartilagineis scabris, primum ciliatis. *Panicula* multiflora; bracteae late ovatae, acutae, trinerves; pedicelli 4 mm. (fructiferi 12 mm.) longi, medio articulati; flores 2–4-fasciculati, fere 1·5 cm. diam. *Perianthium* album; segmenta oblongo-lanceolata, acuta, 2 mm. lata, medio trinervia. *Filamenta* 5 mm. longa; antherae lanceolato-sagittatae, 1·5 mm. longae. *Ovarium* oblongum, trilobum; stylus filiformis. *Capsula* profunde trilobata, 8 mm. longa, 6 mm. lata, marginibus incrassatis cartilagineis. *Semina* nigra, compressa, 2 mm. longa.

British Central Africa. Nyasaland: Tuchila Plateau, Mlanji, 1800 m., *Purves*, 17.

863. **Hymenophyllum Thomassetii**, *C. H. Wright* [Filices-Hymenophyllaceae]; *H. tunbridgensi*, Sm., proximum, frondorum segmentis et involucris subintegris differt.

Rhizoma repens, gracile. *Stipes* erectus, gracilis, glaber, circa 1 cm. longus. *Lamina* bipinnatisecta, 5 cm. longa, 2·5 cm. lata,

glabra ; segmenta linearia, 0·7 mm. lata, praesertim versus apices minutissime serrata ; rhachis anguste alata. *Sori* quasi-axillares ad rhachin ; involucrum breviter ovatum, integrum vel minutissime dentatum.

British Central Africa. Mount Mlanji, 2400 m., *Thomasset.*

XXVII.—MIRACULOUS FRUITS OF WEST AFRICA.

(*Sideroxylon dulcificum*, A. DC.)

Travellers in tropical Africa have frequently drawn attention to the existence of a plant whose fruit could change the flavour of the most acid substance into a delicious sweetness. The plant is a member of the natural order *Sapotaceae.* It is known to the Fante races as *assarbah*, and in the Accra and Adampe districts of the Gold Coast as *tahmé.* It is indigenous to Ashante, and extends to Popo, Dahomey, Yoruba, and many districts in the Gulf of Guinea. The tree is seldom found near the coast. The largest quantities of fruits are obtained from a considerable distance inland, and from localities with rich and loamy soils.

A full account of the plant is given in the *Pharmaceutical Journal*, Vol. XI. (1852), pp. 445–448, by Dr. Daniell, under the name of *Synsepalum dulcificum.* In De Candolle, Prodromus VIII., p. 183, it is described as *Sideroxylon dulcificum*, DC., the name now adopted. It is a small tree or shrub with leaves four to five inches long, crowded at the ends of the branches. The flowers are small and numerous, produced in the axils of the leaves. The fruit resembles a small plum with the seed invested in a thin soft pulp, wherein lies the peculiar sweetening property.

A somewhat similar property to that described as existing in *Sideroxylon dulcificum* is also said to exist in a plant belonging to the natural order *Scitamineae.* This is the *katemfe* or *katemphe* of the Akoos and other Yoruba tribes, and is the "miraculous fruit of the Soudan." It is described in the *Pharmaceutical Journal*, Vol. XIV. (1855), p. 159, as *Phrynium Danielli*, Bennet, the name under which it is now known being *Thaumatococcus Danielli*, Benth.

With regard to the *Sideroxylon* fruits Mr. W. H. Johnson, Director of Agriculture, Gold Coast, informs me that he has found them particularly useful when taking quinine for fever, and that if a lemon be sucked within two or three hours of eating one of the fruits its acid flavour is entirely counteracted.

With the view of having the properties of these plants investigated plants were obtained from Lagos in 1889, and distributed to India and several of the Colonies, but as yet no record concerning them has been received at Kew.

J. M. H.

XXVIII.—THE EBEN TREE OF OLD CALABAR.

(*Pachylobus edulis*, G. Don.)

The Eben tree is cultivated in various parts of Old Calabar for the sake of its fruits, the outer portion of which is eaten after being boiled or roasted. Examples of these fruits were first sent to Kew with this name by the Rev. Hugh Goldie in January, 1888. These were collected in Creektown. The writer's attention was directed to them, ten years later, by the Keeper of the Museum at Kew, who suggested that on his return to West Africa the writer should furnish material adequate to admit of accurate determination. At the time this suggestion was made the fruits were believed to belong to a tree of the natural order *Laurineae*. The specimens the writer was able to supply were taken from an Eben tree in the Botanic Garden at Old Calabar. They reached Kew in 1898, and showed that the Eben tree is *Pachylobus edulis*, G. Don (Natural Order *Burseraceae*). In September, 1905, Mr. McLeod, of the Forestry Department, Southern Nigeria, sent another specimen collected at Uwet, on the Calabar River. There were no fruits with the Uwet specimen.

The species has been figured in *Hooker's Icones Plantarum*, t. 2566–7 (1899), where its synonymy and distribution are stated to be as follows :—

"**Pachylobus edulis**, G. Don, Syst. ii., p. 89.

Canarium edule, Hook. f. in Hook. Niger Flora, 285.

Canarium edule, Hook. f. in Hiern Cat. Afr. Pl., Welw. i., 127.

Canarium Mubafo, Ficalho in Bol. Soc. Geogr. Lisbon, Ser. 2, p. 611, et Pl. Ut. Afr. Portug., p. 115.

Pachylobus Saphu, Engl. in Engl. & Prantl. Naturl. Pfl., Fam. iii., 4, p. 243.

Canarium Saphu, Engl. Jahrb., xv., p. 99.

"West Tropical Africa—

Island of St. Thomas ; G. Don.

Old Calabar ; Thomson.

Cameroons ; Mann, Preuss, Bucholz.

Cuzengo ; Welwitsch, 4482, 4483.

Wathen Station, or Ngombe, 34 miles below Stanley Pool ; Bentley.

"*Canarium Schweinfurthii*, Engl., a genuine Canarium having a thick, exceedingly dense and hard endocarp, has been confused with *Pachylobus edulis*, G. Don. Both trees yield an edible fruit and bear similar or perhaps in some districts the same name, and the leaves are sufficiently alike to deceive a superficial observer. The first-named is evidently very wide-spread, ranging from near the West Coast in Angola, eastward to the lakes and northward to Uganda.

"*Pachylobus edulis* is cultivated from St. Thomas and the Cameroons to the Congo at least, and it is figured here in consequence of Kew having received from the Rev. W. H. Bentley,

of the Congo Baptist Mission, fruits purporting to represent the wild and cultivated varieties of the same tree—in reality the fruits of the two trees under consideration. Numerous specimens from different localities seem to establish the specific identity of *Pachylobus Saphu* with *P. edulis*. Indeed, Don's original specimen of the latter is labelled 'Safu,' and Don stated the fruit was a native of St. Thomas, and its fruit was sold in the island under that name."

"Eben" is the Eifik name, although Thomson, with the specimen referred to in the Icones, from Old Calabar (1863), does not mention the name, nor does he make any remark as to the uses to which it is put. Mr. McLeod gives the name "Eban" with his specimen (1905).

The writer observed the tree on the way to Uwet overland from Old Calabar; at Okuni on the left bank, and at Ikum on the right bank of the Cross River; but he does not remember having seen it at any place visited westward of the Old Calabar district.

The so-called African Elemi has been attributed to this species. *See* Planchon and Collin in "Les Drogues Simples," ii., 358, *Canarium edule*, Hook. f.; Moloney, "Forestry of West Africa," *Canarium edule*, Hook. f., "Mpafu" or "Mubafo"; Hiern., "Catalogue of Welwitsch's African Plants," i., 127 (stated here to also yield an oil), *Canarium edule*, Hook. f., more especially with reference to the specimens named "Mutafo" or "Nbafo"; but these statements, together with the note under "'Mpafu' tree of Tropical Africa," *Canarium* sp., in Kew Report, 1880, p. 50, doubtless apply to *Canarium Schweinfurthii*, Engl., the "Mpafu" of Uganda, "Mbafu" of Tanganyika, "Mupafu" of Mukenge, and "Mubafu" of Angola, as in Engler, "Pflanzenwelt Ost-Afrikas," B. 199, where the matter relating to the Elemi and oil seems to be, perhaps for the first time, accurately put. There are several specimens of *Canarium Schweinfurthii* in the Museum which bear out this view.

J. H. H.

XXIX.—MISCELLANEOUS NOTES.

Mr. Walter Hackett, Foreman of the Tropical Department of the Royal Botanic Gardens, has been appointed Assistant Curator of the Botanic Garden, Liverpool. Mr. Hackett entered Kew as a young gardener in September, 1897. He was promoted Sub-foreman of the Tropical Department in January, 1899, and Foreman of the same Department in 1901. The vacancy caused by Mr. Hackett's resignation has been filled by the transfer of Mr. C. P. Raffill from the Temperate House, while Mr. William Taylor, Sub-foreman in the Tropical Department, succeeds Mr. Raffill as Foreman of the Temperate House.

William Mathews, M.A., F.R.G.S. — In June, 1901, Mrs. Mathews communicated to Kew the desire of her husband

to dispose of his botanical collections where they would be useful, and offered to send the whole to Kew to be retained there or be presented to other establishments, as the Director should advise. The offer was accepted, and, by mutual agreement, the excellent British collection was presented to the Hastings Museum, Worcester, and the considerable Foreign collection, with the exception of a few specimens retained for Kew, was presented to the herbarium of Glasgow University. Mr. Mathews died at Broadwater Down, Tunbridge Wells, on the 5th September, 1901, and since his death Mrs. Mathews has found sundry other collections of dried plants which she has transmitted to Kew. Among them were a few from Iceland which have been incorporated in the Kew Herbarium. The others, comprising between 600 and 700 specimens, have been sent to Glasgow. Mr. Mathews was born at Hagley, near Birmingham, in 1828, and was educated at King's College, London, and St. John's College, Cambridge. After taking the degree of M.A., he joined the Birmingham firm of land surveyors of which his father was the head. He began studying botany at Cambridge under Babington, and after his return to Birmingham pursued the subject with great ardour, soon becoming an authority on the flora of Warwickshire and Worcestershire. He was a contributor to the *Phytologist*, the *Journal of Botany*, to Bagnall's *Flora of Warwickshire*, and to Lees's *Botany of Worcestershire*, and was the author of a *Flora of the Clent and Lickey Hills*. His travels abroad were chiefly in the Alps and Algeria, where he made the foreign collections alluded to above. The results of his study of the flora of Algeria are given in a little work entitled *The Flora of Algeria considered in Relation to the Physical History of the Mediterranean Region and supposed Submergence of the Sahara*, published in 1880. Mr. Mathews was also a geologist and a great climber of peaks. He was a personal friend of the late John Ball, and one of the co-founders of the Alpine Club, a contributor to its literature, and one of its early Presidents. In recognition of his geographical discoveries in the Italian Alps, he was decorated by King Victor Emmanuel with the Order of St. Maurice and St. Lazare.

Picea breweriana.—Arboriculturists will be interested to know that there is in the Kew collection of Conifers a specimen of this remarkable Spruce. The species has been found wild only on the summits of the Siskiyou Mountains in Northern California, and in one locality on the coast range of Oregon. One of the rarest of all trees, its numbers, even in a wild state, are, so far as is at present known, limited to a few scores. The Kew plant was presented to Kew in its seedling state by Professor Sargent, of the Arnold Arboretum, Mass., a few years ago, and it is, we believe, the only one alive in Europe. It is now about four feet high and in perfect health. The species was first discovered in 1884, but seeds were not collected till 1892. Of the thousands of young plants raised in the Eastern States of North America from these seeds, scarcely any survived, and a few grafted plants in the Arnold Arboretum are all that now remain.

Picea breweriana belongs to the *Omorica* section of the genus —an interesting group known commonly as the "flat-leaved Spruces." They differ from the commoner Spruces (of which *P. excelsa* is the type) in the leaves being more or less flattened (not tetragonal), and in bearing stomata on the upper surface only. The group is remarkable for the curiously isolated habitats of its members; one is found in South-East Europe, one in the Himalaya, another in Japan, and two in Western North America. Recent exploration in China has also revealed the existence of allied species there. *P. breweriana* attains to a stature of over 120 feet, and is distinguished by its beautifully pendulous branchlets which, whilst being no thicker than a lead pencil, hang straight down six or eight feet in length. This characteristic is only to be seen in adult trees; the young specimen at Kew is of sturdy habit, and in general appearance similar to its ally, the Servian Spruce, *P. omorica*.

A photograph of the tree of *Robinia Pseudacacia* struck by lightning in the Royal Gardens on May 8th last and referred to in Bulletin No. 4, 1906, p. 124, has been placed in the Annexe of the Timber Museum, where are also a section from the base of the stem and a photograph of the Deodar shattered by lightning near the Palm House in August, 1885.

Lecythis Fruit. — Messrs. Bieber & Co., of Fenchurch Avenue, E.C., have recently presented to the Museum a fruit of an unknown species of *Lecythis* from Brazil. Its dimensions are:—Height, 11 ins.; greatest diam., 13½ ins.; weight empty, 8¼ lbs., of which the operculum or lid weighs 14 ozs. This will form an interesting addition to the series of these curious woody fruits placed in Case 56, Museum No. 1.

Chilian or Coquito Nut Palm (*Jubaea spectabilis*, H.B.K.).—The Museum is indebted to Prof. C. S. Sargent, Director of the Arnold Arboretum, for a sample of "Miel de Palma" or Palm Honey from Chile, prepared from the sap extracted from the trunk. A good tree, it is said, will yield as much as 90 gallons of sap, which is concentrated by boiling into the thickness of treacle. The fruits may frequently be met with in this country under the name of "Pigmy Cocoa Nuts" or "Stanley Nuts." The kernels are edible and are made into various kinds of confectionery. *See* Museum No. II., Case 62.

A fine specimen of this palm is growing in the Temperate House.

Orchella Weed.—Under this name, which is usually applied to various species of *Roccella*, a specimen of Lichen from the West Coast of South America was recently received from a Liverpool firm for determination. The plant was found to be *Parmelia trulla*, Ach. This species, so far as can be gathered, has not been used for commercial purposes, although various other lichens, and among them several species of *Parmelia*, have been employed as substitutes for *Rocella*. None of these substitutes has been considered, however, to be of the same value as *R. tinctoria*.

Before the introduction of coal-tar dyes, Orchella or Orchil was largely used for dyeing, the principal species so employed being *Roccella tinctoria*. At the present time, Orchella is chiefly employed in the preparation of Litmus.

Oil-seeds.—Samples of Oil seeds for determination are frequently received at the Museum, more particularly from Liverpool and London firms. Of those recently submitted the following may be recorded :—

Owala of Gaboon, Opachala of the Eboe country (*Pentaclethra macrophylla*, Benth.), a tree of the natural order *Leguminosae*, native of Upper Guinea, attaining a height of 50 or 60 feet. The thick woody pods are 20 to 25 inches long, and $3\frac{1}{2}$ to 4 inches broad, and contain much-compressed dark brown shining seeds, samples of which have been frequently received from Liverpool oil merchants for determination.

The seeds are employed as food on the Niger, and the natives extract a fatty oil from them which they use for domestic purposes. The oil is also suitable for lubricating machinery, for candle-making and soap-making. The yield of oil is estimated to be 45 per cent., and the refuse cake after the expression of the oil is stated to contain 30 per cent. of albuminoids.

Specimens of the pods, seeds, and oil are exhibited in Case 43, Museum No. 1. A living plant will be found in the collection.

Kusam Lac Tree of India (*Schleichera trijuga*, Willd.).—A large tree of the order *Sapindaceae*, found in the dry forests from the North-west Himalaya at Sirmor, throughout Central and Southern India, Burma and Ceylon, Java, Timor, &c. The fruit is $\frac{3}{4}$ to 1 inch long, containing one to three seeds, surrounded with a whitish pulpy edible aril. According to Dymock in "Pharmacographia Indica," the seeds yield an oil used for burning in lamps in India, and it is reputed to be the original Macassar oil, and is also stated to be a valuable stimulating and cleansing application to the scalp, which promotes the growth of the hair. The tree is further valuable as it affords a strong durable timber, employed to a considerable extent in India for oil and sugar mills, rice pounders, agricultural implements, &c. It is also considered the best tree for lac, known in commerce under the name of *kusam*.

An interesting series of products from this tree, including Macassar oil from the Dutch East Indies, and samples of "Samba"

or "Key Nuts" and oil received from the neighbourhood of New Guinea, are shown in Case 27, Museum No. 1. A living plant will be found in the collection.

Shea Butter Tree (*Butyrospermum Parkii*, Kotschy), found in Upper Guinea and Nile Land. It belongs to the natural order *Sapotaceae*, and attains a height of 30 to 40 feet, with a trunk 5 to 6 feet in diameter, branching like an oak, and yielding a copious milky juice which coagulates into a friable resinous substance, resembling an inferior quality of gutta. The fruit is ellipsoid, 1½ to 2 inches long with a thin pericarp, and usually contains a single seed with very thick cotyledons. A solid fat is obtained by the natives by drying the kernels in the sun, after which they are bruised and finally boiled, when the fat floats to the surface, and is skimmed off for use. This product is employed by the natives as food, for anointing their bodies, and also as a luminant. Shea butter is exported to Europe for the manufacture of soap, chiefly in combination with other oils. A gutta-like substance to the extent of ·7 to ·75 per cent. is present in Shea butter. *See* Kew Report for 1878, p. 38. Specimens of all these products are contained in Case 73, Museum No. 1. A living plant will be found in the collection.

Collection of Drawings of Orchids by the late John Day.—In September, 1902, Mrs. Wolstenholme, of High Cross, Tottenham, sister of Mr. John Day, well known during his period as an amateur grower of orchids, presented to Kew the very valuable collection of drawings of cultivated orchids made by that gentleman. Mrs. Wolstenholme had previously bequeathed the collection to Kew, but felt that she was delaying its usefulness by keeping it in her possession. As delivered at Kew, it consisted of 53 oblong books of about 90 pages each, with a complete index. The books have since been bound in 17 volumes, and they contain approximately 3,000 coloured drawings, with about 500 in sepia, besides copious original notes and a large number of cuttings from the "Gardeners' Chronicle" and other papers relating to orchids. We have not succeeded in finding any published biography of the author, and only a few scattered facts concerning his life and his collections. But Mrs. Wolstenholme has communicated the following particulars: John Day was born on February 3rd, 1824, in London, where his father, a city merchant, resided until 1840, when the family removed to a pleasant old house in Tottenham. After his father's death in 1851 he continued to live at the old home, and from there he married in 1853; but losing his wife in 1857, he sold the old home, and joined Mr. and Mrs. Wolstenholme at High Cross, Tottenham, the present residence of Mrs. Wolstenholme. Thither, in 1858, he removed his large collection of cultivated ferns, to which he had for some years devoted much attention. Shortly afterwards he took up the cultivation of orchids. He built suitable houses, and soon filled them with valuable plants. In course of time his collection became one of the richest and most famous of the period. Then his health broke down, and he visited the Mediterranean countries, which gave him a zest for

travelling to more remote places, and he subsequently went to India, Ceylon, Brazil, and Jamaica. In 1881, previous to these longer journeys, his collection of orchids was brought to the hammer, and realised £7,000. Three plants of *Cypripedium Stonei*. var. *platytaenium*, fetched over £400. Subsequently he again became a collector of living orchids, chiefly of rare and curious kinds. But latterly he devoted much attention to the dried ferns he had collected on his travels. He died on January 15th, 1888, and his second collection of orchids was sold in May of the same year, when a small plant of the *Cypripedium* mentioned above brought the sum of £159 12*s*.

For some years Mr. Day employed Mr. C. B. Durham, a miniature painter, who exhibited largely at the Royal Academy and Suffolk Street galleries between 1828 and 1858, to make coloured drawings of orchids ; and from a note in the Kew Correspondence there were 300 drawings by this artist made at a cost of £3 each. This collection, described as a very fine one, was sold by auction after Mr. Day's death, and is now the property of Mr. Jeremiah Colman, of Gatton Park, Surrey.

We have mentioned Durham, because his name occurs here and there in Day's books, appended to the drawing of a flower or a plant, and because he appears to have given Day lessons in drawing. In Book iv., p. 10, for instance, there is the note, appended to a drawing of *Cattleya bicolor* : "My 9th lesson." At p. 66 of the same book is a coloured drawing of *Cattleya Schilleriana splendens*, and the following note : "Drawn by Mr. Durham, June, 1862 ; the first drawing he ever did here. This from the plant bought at Mr. Allen's sale at Stevens's in June, 1860, and the subject of Mr. Durham's beautiful drawing in Vol. vii., p. 11."

In 1863 Mr. Day himself began sketching, the first sketch being dated January 10, and he continued to make drawings up to within a few weeks of his death, January 15, 1888 ; the last but one bearing the date November 12, 1887, the last being undated. All of the earlier ones are in ink ; but in many places he afterwards added coloured sketches, always giving the date when done. The earliest sketches are somewhat rough and diagrammatic, though botanically correct ; but he improved rapidly, and his later work was admirably executed, both as to drawing and colouring. Day must have been very industrious at that period, for by the middle of February, 1864, he was half way through his seventh book, where (page 45) there is a coloured figure of *Cypripedium purpuratum*, with the following note : "This is the first drawing I attempted in colours, using Gerty's paint box. I was sufficiently satisfied with the result to buy a box for myself." His satisfaction was quite justifiable, and his perseverance was soon rewarded with great success. Practically all he did after this was coloured. In December, 1882, he wrote to Kew applying for a pass of admission to the gardens before the general public, in order that he might make drawings of the "smaller, insignificant orchids." This was granted, and writing again in 1886 he mentions that he had drawn at least 70 that he had not seen elsewhere. His last Kew drawing is dated October 29, 1887. From time to time he presented living plants to Kew.

The fact that the John Day collection contains drawings of a large number of the types of Reichenbach's species adds greatly to its value, as most of them are not otherwise represented at Kew, and probably in no other herbarium except the Reichenbachian shut up at Vienna, which, according to the terms of Reichenbach's testament, will not be accessible till 1914.

W. B. H.

Additions to the Herbarium during 1902.—Donations of specimens were made by more than eighty persons and institutions, and amounted to over 11,500 sheets. The specimens purchased amounted to about 6,500. The principal collections are enumerated below.

VARIOUS PARTS OF THE WORLD. *Presented*:—Cyperaceae, by Mr. C. B. Clarke; species of Selaginella described by Warburg and Hieronymus, by Botanic Garden, Berlin.

Purchased:—Kneucker, "Cyperaceae et Juncaceae Exsiccatae," lief. iii.–iv.; "Gramineae Exsiccatae," lief. vii.–x.

EUROPE. *Presented*:—"Kryptogamae Exsiccatae," Cent. viii., by the Imperial Natural History Museum, Vienna; "Hieraciotheca gallica et hispanica," fasc. xii., by M. G. Gautier; Herzegovina, by Mr. A. Callier.

Purchased:—Rehmann and Woloszczak, "Flora polonica exsiccata," Cent. ix.; Degen, "Gramina Hungarica," fasc. i.; Dahlstedt, Scandinavian Hieracia, Cent. xiv.

ORIENT. *Presented*:—Persia, by Mr. St. George R. Littledale; Syria, by the Rev. G. E. Post; Statice hybrids from the Canary Islands, by Dr. G. V. Perez.

Purchased:—Sintenis, Transcaspia and N. Persia, Cent. i.–iv*a*.

NORTHERN ASIA. *Purchased*:—Karo, Amur Region.

CHINA AND JAPAN. *Presented*:—E. H. Wilson, China and Tonkin, by Messrs. J. Veitch & Sons; Japanese Acer and Tilia, by Mr. Homi Shirasawa.

INDIA. *Presented*:—Simla Herbarium of the late Col. Sir H. Collett, by Mr. E. Collett; Bombay, by Dr. T. Cooke, C.I.E.; Johore, by Mr. C. H. Ostenfeld; Upper Burma, by Sir D. Brandis, K.C.I.E.; Penang, by Botanic Gardens, Penang; various parts of India, by Botanic Gardens, Calcutta.

MALAYA. *Presented*:—Weinland, New Guinea, by Botanic Garden, Berlin; Tengger Mts., Java, by Botanic Gardens, Buitenzorg.

AUSTRALIA. *Presented*:—West Australia, by Dr. A. Morrison; Victorian Characeae, by the Rev. F. M. Reader; rare Australian species, by Mr. J. H. Maiden; duplicates of Robert Brown's Australian Euphorbiaceae, by the British Museum (Nat. Hist.).

Purchased:—Pritzel, West Australia.

NEW ZEALAND. *Presented*:—Set of Veronica and Gentiana, by Mr. T. F. Cheeseman.

Tropical Africa. *Presented:*—Gold Coast, by Mr. W. H. Johnson; Dawodu, Lagos, by Sir W. MacGregor, K.C.M.G., C.B.; Angola, by Mr. J. Gossweiler; Sudan, by Mr. A. F. Broun; Uganda, by Mr. J. Mahon; Zanzibar and Pemba, by Mr. R. N. Lyne; Nyasaland, by Mr. J. McClounie; various German collections, by Botanic Garden, Berlin.

Purchased:—Zenker, Cameroons; Kässner, British East Africa; Busse, German East Africa.

Mascarene Islands. *Presented:*—Seychelles, by Mr. H. P. Thomasset.

South Africa. *Presented:*—Komati Poort, by Lieut. J. W. C. Kirk; Major A. J. Richardson, Orange River Colony, by Mrs. Richardson; Natal, by Botanic Gardens, Durban; Namaqualand, by Miss E. Foxwell; various parts of South Africa, by Dr. H. Bolus; do. by Dr. Hans Schinz.

North America. *Presented:*—Grasses of the Western United States, by the United States Department of Agriculture; "Exsiccatae Grayanae," by the Gray Herbarium of Harvard University; Western Minnesota Mosses, by Prof. J. M. Holzinger; North American Trees, by the Arnold Arboretum; Californian Lichens, by Dr. H. E. Hasse.

Purchased:—Rosendahl and Brand, Vancouver Island, Cent. i.; Cusick, Eastern Oregon; H. M. Hall, San Jacinto Mountains, California; Elmer, Monterey, California; Trask, Sta. Catalina, California; C. F. Baker, West Central Colorado; Eggleston, Vermont; Curtiss, Southern United States, ser. viii.

Central America. *Presented:*—Langlassé, Mexico, by M. M. Micheli; Palmer, Acapulco, by the Gray Herbarium of Harvard University.

Purchased:—Tonduz, Costa Rica.

West Indies. *Presented*:—Heller, Puerto Rico, by the New York Botanic Garden; Britton and Cowell, St. Kitts, by the New York Botanic Garden; Jamaican Fungi, by the Department of Public Gardens and Plantations, Jamaica.

Tropical South America. *Presented:*—British Guiana, by Mr. G. S. Jenman; Langlassé, Colombia, by M. M. Micheli.

Purchased:—Miller and Johnston, Margarita Island, Venezuela.

Temperate South America. *Presented*:—Chile and Argentine Frontier, by Mr. H. J. Elwes; Chilian Ferns, by Staff-Surgeon S. W. Johnson.

Purchased:—Dusén, Chilian and Patagonian Mosses.

The most important accession was the first set of E. H. Wilson's Chinese plants, collected during his first journey for Messrs. J. Veitch & Sons, by whom the set was presented. The collection contained about 2,700 numbers, chiefly from Western Hupeh. The complete nature of the specimens deserves remark, both flowers and fruit having been collected in a very large number of instances.

Another valuable addition was the Simla Herbarium of the late Col. Sir Henry Collett, K.C.B., presented by his brother, Mr. Edward Collett. It is the type collection from which Collett's *Flora Simlensis* was elaborated.

An interesting set of specimens from Mahé, Seychelles Group, was contributed by Mr. H. P. Thomasset, who has devoted much time to the investigation of the rarer trees of the island.

A fine series of specimens of *Pachira aquatica*, Aubl., and *P. insignis*, Savigny, accompanied by fruits, was communicated by the late Mr. G. S. Jenman, and was exhibited at a meeting of the Linnean Society of London (*see* Proc. Linn. Soc. 1901–1902, p. 11). It was found that the two species were best distinguished by their flowers, and that they could not be distinguished by their fruits, which exhibited great parallel variations in size and shape.

Additions to the Herbarium during 1903.—Donations of specimens were made by about one hundred persons and institutions, and amounted to over 36,000 sheets. The specimens purchased amounted to over 10,000 sheets. The principal collections are enumerated below.

VARIOUS PARTS OF THE WORLD. *Presented:*—The Herbarium of the late Dr. R. C. Alexander Prior, bequeathed by him.

Purchased:—Kneucker, "Cyperaceae et Juncaceae Exsiccatae," lief. v.; "Gramineae Exsiccatae," lief. xi.–xiv.; "Carices Exsiccatae," lief. xi.

EUROPE. *Collections presented:*—Hampstead Herbarium of the late Richard Heathfield, Q.C., by Mrs. Cooke Yarborough; Algae of the Faeroe Islands, by Herr F. Börgesen; "Herbarium Florae Rossicae," fasc. xix.–xxiv., by the Imperial Botanic Garden, St. Petersburg; "Flora Exsiccata Austro-Hungarica," Cent. xxxv.–xxxvi., by the University Botanical Museum, Vienna; "Kryptogamae Exsiccatae," Cent. ix., by the Imperial Natural History Museum, Vienna.

Collections purchased:—Wittrock, Nordstedt and Lagerheim, "Algae aquae dulcis exsiccatae," fasc. xxx.–xxxv.; Rabenhorst, "Fungi Europaei," ser. II., Cent. xliv.; Briosi and Cavara, "I Funghi Parassiti," fasc. xv.; Dahlstedt, Scandinavian Hieracia, Cent. xv.; Degen, "Gramina Hungarica," fasc. ii.–iii.; Stribrny, "Plantae Bulgaricae Exsiccatae," Cent. iv., *part.*

ORIENT and CENTRAL ASIA. *Presented:*—Cyprus, by Miss M. E. Lascelles.

Purchased:—Bornmüller, "Iter Persicum alterum, 1902"; Sintenis, Transcaspia and North Persia, Cent. iv*b*.—x*a*.

JAPAN. *Purchased:*—Okamura, "Algae Japonicae Exsiccatae," fasc. ii.

INDIA. *Presented:*—Baudelkhand, by Mrs. A. S. Bell; Malay Peninsula, by Botanic Gardens, Singapore; various parts of India, by Botanic Gardens, Calcutta.

AUSTRALIA. *Presented*:—West Australia, by Mr. G. H. Thiselton-Dyer.

Purchased:—C. Andrews, West Australia; Max Koch, South Australia.

POLYNESIA. *Presented*:—Hawaii and Fiji, by Mr. H. B. Guppy.

TROPICAL AFRICA. *Presented*:—Warnecke, Togoland, by Botanic Gardens, Berlin; Nyasaland, by Mr. J. McClounie; Whyte, British East Africa, by the British Museum; do., by Mr. A. Whyte; British East Africa, by Mr. C. F. Elliott; Portuguese East Africa, by the Ven. Archdeacon W. P. Johnson; Somaliland, by Major Appleton; Sudan, by Mr. A. F. Broun; Grasses, by the Natural History Museum, Paris; do., by Dr. J. A. Henriques.

Purchased:—Zenker, Cameroons.

MASCARENE ISLANDS. *Presented*:—Seychelles, by Mr. H. P. Thomasset.

NORTH AMERICA. *Presented*:—Arctic North America, by Mr. D. T. Hanbury; Canada, by Geological Survey of Canada; Crataegus, by the Arnold Arboretum; Seymour and Earle, Economic Fungi, Suppl. C, by Mr. G. P. Clinton.

Purchased:—Holway, "Uredineae Exsiccatae et Icones," fasc. iv.; Weiz, Labrador; Rosendahl and Brand, Vancouver Island, Cent. ii.; C. F. Baker, West Coast, North America; Elmer, California; Heller, California.

CENTRAL AMERICA. *Presented*:—Various parts, by Capt. J. Donnell Smith; Mexico, by Mr. C. G. Pringle; Gaumer, Yucatan, fasc. i., by the Field Columbian Museum, Chicago.

WEST INDIES. *Presented*:—Jamaica, by the Department of Public Gardens and Plantations, Jamaica.

Purchased:—Curtiss, Bahamas.

EAST TROPICAL SOUTH AMERICA. *Presented*:—Gran Chaco, Paraguay, by Mr. Andrew Pride.

Purchased:—Hassler, Paraguay; Robert, Matto Grosso.

WEST TROPICAL SOUTH AMERICA. *Presented*:—Williams, Bolivian Mosses, by the New York Botanical Garden.

Purchased:—H. H. Smith, Santa Marta, Colombia.

The most important accession was the Prior Herbarium, which has already been noticed (*Kew Bull.*, 1903, p. 32).

Three valuable Tropical American collections were received during the year. The most extensive was the second set of H. H. Smith's Santa Marta plants, which contained nearly 2,500 specimens. Mr. Smith's original plan was to explore the whole Department of Magdalena, Colombia, but he was prevented from doing so by a civil war which broke out in 1899, and made travelling practically impossible. Consequently he was restricted to a limited area, extending about 50 miles east of the town of Santa Marta and 40 miles south, never more than 30 or 35 miles

from the coast. Mr. Smith considers that his collection is very nearly complete for altitudes below 4,000 feet; it is certainly one of the finest botanical collections made in a limited area in South America. The first set is in the Herbarium of the New York Botanical Garden, and has been named in large part by Dr. H. H. Rusby, with the co-operation of specialists.

A further instalment was received of Hassler's Paraguay plants, amounting to nearly 1,500 sheets. It included his collections of the years 1900-1902. Most of the determinations have already been published in the *Bulletin de l'Herbier Boissier*, under the title *Plantae Hasslerianae*, edited by Dr. R. Chodat, who still continues the list, in collaboration with Dr. Hassler. Many of the orders have been worked out by specialists.

A valuable collection of more than 1,000 Mexican plants was received from Mr. C. G. Pringle, in part exchange for the late Dr. Prior's set of Hooker and Thomson's Indian plants. It included Mr. Pringle's collections of 1901 and 1902, and his re-issued species of the same years.

A set of over 1,200 West Australian plants, collected by Mr. Cecil Andrews, was acquired by purchase.

One of the most interesting accessions was a collection of nearly 100 drift-fruits and seeds from the Pacific, presented by Mr. H. B. Guppy, who has embodied the results of his observations in a volume on plant dispersal in the Pacific (*Observations of a Naturalist in the Pacific between* 1896 *and* 1899. Vol. II. London, 1906).

Nymphaea capensis, *Thunb.*—Through the courtesy of Dr. F. R. Kjellman, Director of the Botanic Garden, Upsala, Kew has had the type specimen of *Nymphaea capensis* on loan, and Mr. J. R. Drummond furnishes the following note on the results of his comparison of the South African and Indian forms often referred to *N. stellata*, Willd.

Nymphaea capensis, Thunberg in Prodromus Plant. Cap. Pars Post., p. 92 (1800). Specimen authenticum ex Herb. Upsal.

In the joint opinion of Mr. N. E. Brown and the writer of this note, the following are identical with the above, viz., *Nymphaea scutifolia*, A. P. de Candolle in Syst. Nat. II. 50 (1821); also *N. caerulea*, Dryander ined. ex Sims, *Bot. Mag.* t. 552 (1801); also Andr. Rep. t. 197; and *N. stellata* of Harvey in *Flora Capensis*, I. 14, (not of Willd.).

We have not seen Krause No. 1235, *Flora Cap- und Natal-landes*, p. 25, which is the *N. capensis*, Thunb. of Meisner in Hooker's *London Journal of Botany*, I. 461, but as Krause collected it in the Zitzikamma river "Uitenhage," that was probably the true plant of Thunberg, whose name was otherwise lost sight of, partly owing to the brevity of his description, but partly owing to comparison with dried specimens and figures of other Nymphaeas, notably with the Egyptian *N. caerulea* of Savigny and the *N. stellata* of Willd., a very different form which, though

allied to certain West African types, does not occur in South Africa. The true *N. capensis* is represented in the Kew Herbarium by the following examples :—

457 Zeyher, in the Zwartkop River, District of Uitenhage ;

4202 Burchell, collected in Bushman's River, near Rautenbach's Drift, Albany Div., Nov. 2, 1813 [this is the type of *N. scutifolia*, D.C.] ; 19 Ecklon and Zeyher, 1835, "in rivulo prope 'Zeekoe-valley' (Cap) et in fluvio 'Zwartkop's Rivier' (Uitenhage) Jan-Mart" ;

[In the river at Enon, Uitenhage Division] South Africa, Drege ; 1084/P.M.O. Macowan, in fluvio Zwartkopsa Uit. [c. 1867] ; 701 Macowan and Bolus, in alveo fluminis Zwartkop's Rivier prope Uitenhage, Dec. 1886 ; 1041 R. Baur, Enon. b. Uitenhage ; 2261 Wolley-Dod, Retreat Vley [leaf doubtful].

Other specimens from South Africa referred to *N. capensis*, *N. scutifolia* and *N. stellata*, are more or less unsatisfactory or doubtful, and those from the Transvaal and Zambesi region rather approach *N. zanzibariensis*, Caspary, a form united with *N. scutifolia*, DC., by Hook. fil. and others, but probably a good species.

N. capensis, Thunb., seems to be endemic in South Africa from Cape Town to the Natal border, in rivers and pools, chiefly near the coast ; the forms from Madagascar and the Comoro group that have been referred to the same species appear to be distinct, and are probably, as most species of the genus evidently are, very local in their distribution.

Thunberg's plant was doubtless that given by Breyn (Prodr. II., p. 86, 1739 ed.) as "Nymphaea flore caeruleo odoratissimo Capitis Bonae Spei" ; De Candolle quotes the same description from the earlier edition (1689), which is the first mention seemingly of this species. It was afterwards confounded with the scentless Egyptian rice-field plant by Ventenat (Malmaison, 6), and with *N. stellata*, Willd., under which designation it appears in Bolus and Wolley-Dod (Trans. S. Afr. Phil. Soc. XIV. 207) as "locally frequent in Vleys." Thunberg's own type appears from Schultes' edition of the *Flora Capensis* to have been collected in the Langekloof country in the month of December. A *Nymphaea* from the Durban flats, figured by Wood and Evans in *Natal Plants*, Vol. I. t. 33, p. 29, as *N. stellata*, Willd., is not apparently *N. capensis*, Thunb., nor *N. stellata*, Willd., but rather to be compared with *N. madagascariensis*, DC., and its immediate allies. Conard ("The Waterlilies," Washington, 1905) has duly reduced *N. scutifolia*, DC., to *N. capensis*, Thunb., but we have not been able to follow his citation of the specimens altogether, and he does not appear to have seen the actual type of Thunberg. There are good examples of *N. scutifolia*, DC., all from the same region as those in the Kew Herbarium, at the British Museum.

Saussurea hieracioides, Hook. f.—Mr. J. R. Drummond, who has had occasion to examine some specimens of *Saussurea* in the Kew Herbarium, has made the following note on the forms described as *S. hieracioides* by Sir J. D. Hooker and as *S. villosa*

by the late Mr. Franchet respectively. In the light of more complete material now available for study, it transpires that the two are conspecific.

Saussurea villosa, Franch. in *Journ. de Bot.*, Vol. II. (1888), p. 353 = *Saussurea hieracioides*, Hook. fil. in Fl. Br. Ind. III. 371.

S. hieracioides, Hook. fil., was founded on a single gathering from Tungu in Sikkim, and named with reference to the radical leaves which recall those of *H. pilosella*, Linn.

Franchet based his *S. villosa* on a Yunnan plant, No. 34 Abbé Delavay, which he distinguished from *S. hieracioides* by the heads (in *villosa*) being smaller, and by the long bristles of the receptacle. In all the examples then known, and in a plant collected in Kansu by Przewalski, which has a large head like that of the specimen now received for examination, the scapes bore one head only, but in No. 589, collected by the late Abbé Soulié in Tachienlu, which in habit and the outline of the radical leaves connects *hieracioides* and *villosa* completely, there is a scape with two heads, while in No. 63 from the same there are numerous heads in a rather close irregular corymb, No. 6762 Henry from Hupeh, which Mr. Hemsley has referred to *S. villosa*, Franch., has root leaves nearly a foot in length, and the scape is branched fastigiately for about the last five inches. 607 and 653 Pratt (Tachienlu) show the gradation in the leaves and heads quite plainly, and there can be no doubt that the whole material noted above as well as No. 370 Soulié belongs to one very variable species. I can find no difference in the paleae, which indeed seem to vary in the same capitulum. The flowers have the smell of the European *Centaurea nigra*, Linn.

HAB. Alps of Indo-China 9–13,000′ from Inner Sikkim to Yunnan and the Kiala Province of West China.

Botanical Magazine for June.—The plants figured are *Magnolia hypoleuca*, Sieb. et Zucc., *Gonioscypha eucomoides*, Bak., *Gerbera aurantiaca*, Sch. Bip., *Gladiolus primulinus*, Bak., and *Rhododendron Vaseyi*, A. Gray, all of which are in cultivation at Kew. The *Magnolia* is a distinct species, native of Japan and China, valued in the former country for its timber and in China for the tonic medicine prepared from its bark and flowers. The latter are large, creamy white or white, and are produced when the leaves are nearly mature. The Kew plant, now about 14 ft. high, was raised from seed received from a Japanese nursery in 1890. *Gonioscypha* is a Liliaceous genus of the tribe *Aspidistreae*. *G. eucomoides*, the only species, is a native of the Eastern Himalaya. Mr. W. Bull, of Chelsea, first introduced it into cultivation, and he presented a plant to Kew about the year 1886. The *Gerbera* is a fine species from Natal and the Transvaal, having flower-heads 2–3 inches in diameter, the ray-florets bright blood-red above and yellow beneath. The Kew plant was purchased from Mr. Max Leichtlin, of Baden-Baden. *Gladiolus primulinus* is a tropical African species remarkable in having bright yellow flowers. The plant figured was sent to Kew by Mr. C. F. H. Monro, of Bulawayo, and flowered in a

frame in September last. *Rhododendron Vaseyi* is found only in North and South Carolina, and its closest allies are natives of Japan. "It adds another to the now very numerous cases of remarkable relationship between the Chino-Japanese and the Alleghanian floras." The drawing was prepared from plants raised from seed communicated by Prof. Sargent in 1891.

Flora Capensis.—A further instalment of this work, prepared at Kew on behalf of our South African colonies, has appeared. This part, vol. iv., sect. i., part ii. (pp. 193–336), contains the conclusion of the genus *Erica* by the late Prof. Guthrie and Dr. Bolus. Although the conception of the species is by no means narrow, their number reaches the enormous total of 469, of which 87 are described here for the first time. The main features of the distribution of the species of *Erica* in South Africa have, of course, been known for a long time. They are so obvious that the most casual observer could not have overlooked them; but it is only now that we are able to gauge them accurately. About 90 per cent. are found in the "Coast Region," some of them extending to the "Central Region," and very few beyond it. "Their greatest concentration," as the authors say, "may be on the Cape Peninsula, where 92 species have been recorded in an area of 198 square miles; but the home of the more beautiful, and now rarer, species is in the Caledon Division." Many of the species are extremely local. The great variability of almost all the organs makes the discrimination of individual variations and of forms which might reasonably be treated as species extremely difficult, and demands much experience and tact, such as can only be acquired by continued observation in the field and the study of extensive collections. No men with better qualifications for that task than the authors could have been found.

Considering the extremely limited distribution of numerous species it is not surprising that not a few of them have been collected only once, and some no doubt have since become extinct or only exist in the cultivated state. Moreover, as the early collectors generally paid little attention to indicating the localities where they collected their specimens, we do not know and in some cases may never know the exact area of those species. So far about six per cent. of the Ericas of South Africa have had to be put down with the vague localisation "South Africa." South African heaths having been very much in fashion in European gardens at the end of the 18th and in the beginning of the 19th Century, a tendency developed towards unduly multiplying species by naming and describing, often inadequately, garden plants, which in many cases may have been hybrids, and of which specimens were not always preserved. This accounts for the unusually long list of "imperfectly known species"—there are 90 of them enumerated on pp. 310–312, and of "supposed hybrids" (129). Some of them will probably be found in continental herbaria which the authors were not able to consult, and may yet be cleared up with the aid of Guthrie's and Bolus's monograph.

The last 21 pages of part ii., sect. i., of vol. iv., contain a portion of Mr. N. E. Brown's account of the smaller genera of South African *Ericaceae* (*Philippia* to *Hexastemon*). Among them there is a new monotypic genus, *Platycalyx*, N. E. Br., discovered by Mr. Rust, near Riversdale. The species described by Mr. N. E. Brown number 36, of which nine are new. Their distribution exhibits the same peculiarities as that of the Ericas.

The authors were greatly assisted in their work by the courtesy with which the authorities in charge of the herbaria of Thunberg (Upsala), Harvey (Dublin), and Tausch (Prag) placed the *Ericaceae* of those herbaria at their disposal. Moreover, Dr. Bolus lent the whole of his collections of the smaller genera of South African *Ericaceae*, and Prof. Engler sent some of the types in the Berlin herbarium for comparison.

George Bentham.—Of the many distinguished botanists whose labours and liberality have materially advanced the progress of the Royal Gardens, Kew, as a scientific institution, no one approaches George Bentham for the duration, extent, and value of the services he rendered. Hence it is that the recent publication of a biography of that botanist* by Mr. Daydon Jackson, F.L.S. —for a copy of which the Library at Kew is indebted to the courtesy of the publishers—has an especial interest for the readers of the *Kew Bulletin*.

The materials for Mr. Jackson's work are compiled all but exclusively from an autobiography of 661 quarto pages, a diary for the years 1830 to 1883 in 20 closely written volumes, innumerable letters, and miscellaneous memoranda. These autobiographical MSS. offer advantages of singular value to the biographer, for they are written in a perfectly clear hand, without correction or erasure, in the methodical style that characterized their author's scientific writings. They describe many phases of a singularly varied life—social, literary, and scientific—for as son of a distinguished father—Sir Samuel Bentham—and nephew of the great Jeremy, as an accomplished linguist, and as possessing ample private means, he was welcome in the best society. To have sifted these materials amongst which there was no dross, and sorted the results, must have cost Mr. Jackson great labour and the exercise of no little judgment, and he may well be congratulated on the result in his faithful picture of his hero, of whom a good likeness fronts the title page.

It is not the purport of the *Bulletin* to offer a sketch of Bentham's life and work, of which not a few appeared shortly after his decease,† nor to indicate the numerous characteristic episodes of his life that Mr. Jackson has rescued from oblivion,

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* English Men of Science : Edited by J. Reynolds Green, D.Sc. ; George Bentham, by B. Daydon Jackson : London, J. M. Dent & Co., 1906.

† *See* obituary notices in the Journals of the Royal, Linnean and Geographical Societies ; *Nature*, vol. xxx. ; the Elogé, by Sir W. Thiselton-Dyer, in the Proceedings of the Linnean Society, vols. for 1877–79 ; that of Prof. A. Gray in the Journal of the American Society of Arts and Science, vol. xxix. ; and a fuller biography in the Annals of Botany, vol. xii.

for it is in his relations to Kew that this publication is concerned. These in a strict sense commenced in 1841, when Sir W. Hooker became Director of the Royal Gardens, and continued throughout that directorate and to within two years of the retirement of its successor. But having regard to the fact that the Library and Herbarium of the Royal Gardens were the *fons et origo* of the scientific status of that institution, the guardians of its nomenclature, and the depository of the proofs of its labours, Bentham's services in the formation of these must count, and they antedate the foregoing by 18 years. It was in 1823, when a resident in the South of France, that he visited England and took the opportunity of going to Glasgow to present letters of introduction to Dr. (afterwards Sir William) Hooker, then Professor of Botany in the university of that city. The two botanists foregathered on the spot. Each was forming a botanical library and herbarium, their scientific interests were one and the same, their friendship grew during three succeeding visits of Bentham to Glasgow and ripened into a life-long one. In 1854, finding that his income could not meet the demands for space of his rapidly enlarging library and herbarium, Bentham, with the Director's cordial approval, offered these to the Government for the use of the Royal Gardens, and they were, after some demur, accepted with the condition that they should be permanently attached to that institution and be accessible to scientific botanists. It must be borne in mind that up to that time the Royal Gardens possessed neither of these necessary implements for the conduct of its duties, the desideratum being supplied by the Director's private library and herbarium, the latter the most complete in existence; nor was it till after his death, 11 years subsequent to Bentham's gift being accepted, that the treasures accumulated by the Director were rescued from the auctioneer's hammer by the Government and the two Kew Herbaria united.

From 1854 till his decease Bentham resided in London, and during those 30 years he, with annual intervals of a few weeks for rest, repaired for five days a week to the Herbarium, arriving punctually at 10 a.m. and leaving at 4 p.m., never breaking his long fast of 10 a.m. to 8 p.m. Here he wrote his two Colonial Floras—*Hongkongensis* and *Australiensis—Handbook of the British Flora*, his successive classical annual addresses to the Linnean Society, the *Genera Plantarum*, and a host of minor botanical essays; here, too, he concluded the formation for the University of Cambridge of a consulting herbarium of 30,000 named species from duplicates of his own and that of his friend, Dr. Lemann, which had been left by the will of its founder to that university, subject to a selection by Bentham for his own purpose. This labour occupied him for ten years continuously and was gratuitous, the university providing only paper and the expense of mounting the specimens. During the whole of this 30 years his services were at the disposal of the Director and of the officials of the Garden and Herbarium in all cases where his vast knowledge, experience, and sagacity were sought.

J. D. Hooker.

Presentations to the Library during 1902.—Prof. C. S. Sargent presented 41 books or pamphlets including : *Ahern, Compilation of notes on the most important timber tree species of the Philippine Islands*, 1901 ; *Bontekoe, Gebruik en mis- bruik van de Thee*, etc., 1686 ; *Burckhardt, Aus dem Walde*, 1865–81, 10 vols. ; *Clavé, Études sur l'économie forestière*, 1862 ; *Collection choisie de plantes et arbustes*, 1796, vol. i. ; *Courtin, Die Familie der Coniferen*, 1858 ; *Demontzey, Traité pratique du reboisement . . . des montagnes*, ed. 2, 1882 ; *Gattinger, The Flora of Tennessee*, etc., 1901 ; *Jacobson, Handboek voor de kultuur en fabrikatie van Thee*, 1843, 3 vols., and *Handboek voor het sorteren . . . van Thee*, 1845 ; *Lorey, Handbuch der Forstwissenschaft*, 1888, 2 vols. ; *Mackenzie, Manual of the Flora of Jackson County, Missouri*, 1902 ; *Miquel, Prodomus systematis Cycadearum*, 1861, and others, mostly dealing with shrubs or trees. The Bentham Trustees have presented the continuation of about 20 periodicals and the following : *Amatus Lusitanus, In Dioscoridis Anazarbei de medica materia libros quinque*, etc., 1558 ; *Dreves and Hayne, Choix de plantes d'Europe*, vols. i.–v., 1802 ; *Duhamel du Monceau, Des semis et plantations des arbres*, 1760 ; *Petermann, An account of the progress of the expedition to Central Africa, performed . . . under Richardson, Barth, Overweg & Voges in the years 1850–53*, 1854, and two fine copies of the *Ortus Sanitatis* ; both are in Latin, one without place or date, but supposed to be about 1490, and the other was published at Mainz in 1491 ; this is the first dated Latin edition. *Britton, History of New South Wales from the Records*, vol. ii., and *Historical Records of New South Wales*, vols. i.–vi., 1893–98, with charts, were received from the Agent-General for New South Wales ; 7 dissertations, from Prof. H. Solereder ; 2 dissertations, from Prof. Ed. Schaer ; *Davaine, Recherches sur l'anguillule du blé niellé*, etc., 1857, and the *Year-Book of Pharmacy*, 32 volumes, from Prof. A. H. Church ; *Sachs, Text-Book of Botany*, 1875, *Curtis's Botanical Magazine, new edition . . . arranged according to the natural orders of W. J. Hooker*, vol. i., 1833, *Sir W. J. Hooker, A century of Ferns*, 1854, coloured, also a coloured copy of the *Second century of Ferns* in exchange for an uncoloured one, from Sir J. D. Hooker, G.C.S.I., who has also presented the continuation of several periodicals ; *Moeller, Anatomie der Baumrinden*, 1882, from Sir W. T. Thiselton-Dyer, K.C.M.G. ; *Arrhenius, Monographia Ruborum Sueciae*, 1840, from the Regius Keeper, Royal Botanic Garden, Edinburgh ; *Ceron, Catálogo de las plantas del Herbario*, etc., Manila, 1892, from Dr. A. Henry ; *De Wildeman, Études sur la Flore du Katanga*, fasc. 1 and 2, and other publications of the Musée du Congo, from the Secrétaire Général du Département de l'Intérieur, Brussels ; *Dicksons & Co., A catalogue of Fruit and Forest Trees*, 1827, from Messrs. R. P. Ker & Sons ; *Lelong, Culture of the Citrus in California*, 1900, from Mr. J. Burtt Davy ; *Grew, The comparative anatomy of trunks*, etc., 1675, from Prof. C. S. Sherrington ; *Kanjilal, Forest Flora of the School Circle, N.-W. P.* [*India*], 1901, from Mr. J. S. Gamble, C.I.E. ; *Marshall, Arbustrum Americanum*, etc., 1785, from the Director-in-Chief, New York Botanical Garden ; *New Zealand Department of Agriculture, Conference of . . . Fruit-growers and Horticulturists*, 1901, from Mr. T. W. Kirk ; *Sodiro, Contribuciones al conocimiento de*

la flora ecuatoriana, monografia 1, 1900, from Mr. J. V. Sigvald Muller; *Moore, The Tanganyika problem*, 1903, from the Tanganyika Exploration Committee, through the Bentham Trustees; *Bulletin de la Société dauphinoise pour l'échange des plantes*, ix.–xiii., xvi., 1882–89, from Monsieur R. Buser; *Catalogue of Scientific Papers, compiled by the Royal Society of London, supplementary volume*, 1902, from the Royal Society; *Rumpf, Gedenkboek*, 1902, from the Director, Koloniaal Museum, Haarlem; *Day, Original drawings of Orchids*, 53 volumes and index, presented to Kew by the author's sister, Mrs. Wolstenholme. The following works have been presented by their respective authors: *R. T. Baker and H. G. Smith, A research on the Eucalypts, especially in regard to their Essential Oils*, 1902; *E. S. Barton (Mrs. Antony Gepp), The genus Halimeda*, 1901; *F. C. E. Börgesen, The Marine Algae of the Færöes*, 1902; *J. Briquet, Monographie des Centaurées des Alpes Maritimes*, 1902; *A. H. Church, Food-grains of India, supplement*, 1901; *O. Comes, Chronological tables for Tobacco*, 1900; *F. Coulombier, L'arbre à Thé*, 1900; *L. L. Dame and H. Brooks, Handbook of the Trees of New England*, etc., 1902; *F. H. Davey, A tentative list of the Flowering Plants . . . of Cornwall*, etc., 1902; *H. N. Ellacombe, In my vicarage garden and elsewhere*, 1902; *J. Gravereaux, Les Roses cultivées à L'Haÿ en 1902; W. R. Guilfoyle, Guide to the Botanic Gardens, Melbourne*, [1901?]; *C. W. W. Hope, The Ferns of North-Western India*, 1899–1902; *T. Husnot, Les Prés et les Herbages*, etc., 1902; *V. L. Komarov, Flora Manshuriae*, vol. i., 1901; *V. J. Lipsky, Ghornaya Bukharâ*, etc., part 1, 1902; *C. H. Ostenfeld, Flora Arctica*, etc., part 1, 1902; *I. Palibin, Conspectus Florae Koreae*, part 3, 1901; *J. F. Payne, On the "Herbarius" and "Hortus Sanitatis,"* 1901; *R. A. Philippi, Analogien zwischen der chilenischen und europäischen Flora*, 1893, and *Botanische Excursion in das Araukanerland*, 1896; *G. Radde, Die Sammlungen des kaukasischen Museums, Botanik*, 1901; *J. Ramirez, Sinonimia . . . de las plantas mexicanas*, 1902; *J. C. Schoute, Die Stelär-Theorie*, 1902; *H. Shirasawa, Iconographie des essences forestières du Japon*, vol. i., text and atlas, 1899–1900; *F. B. Smith, Agriculture in the New World*, 1902; *W. A. Talbot, The Trees, Shrubs, etc., of the Bombay Presidency*, ed. 2, 1902; *J. W. H. Trail, the Flora of Buchan*, 1902. Many of the exceedingly useful publications of the United States Department of Agriculture have been presented by the Secretary.

The above list does not include numerous pamphlets which have been received from their respective authors, and others, many of them of considerable interest, which have been presented by Sir W. T. Thiselton-Dyer, K.C.M.G., from his own library.

Zapupe Fibre Plant.—During the past year considerable interest has been aroused in connection with a fibre plant known to the Mexicans under the name of Zapupe. From a note on the subject by the United States Consul at Tuxpam, published in the Monthly Consular and Trade Reports, Washington, U.S.A., No. 298 1905, it appears that for centuries past the Indians have employed

its fibre for the manufacture of ropes, bags, lariats, bridles, cordage and seines, but it is only recently that attention has been seriously directed towards its industrial development.

The Zapupe plant is described as similar in appearance to the Henequen (*Agave sisalana*) of Yucatan, but differs from that plant in producing a greater number of leaves, which are also longer and more fleshy, with a needle-like thorn at the apex and with serrated margins. Leaf for leaf, Zapupe yields rather less fibre than Henequen, but the total yield per plant is greater owing to the greater number of the leaves. The plant readily reproduces itself, as a poling stem produces from 2,000 to 2,500 bulbils or young plants in addition to suckers from the roots of the stump.

The first crop of leaves may be harvested three years from the time of planting, and from the first to the third year after beginning to yield a plant will produce 100 to 110 leaves annually, gradually decreasing to between 75 and 80 leaves, continuing productive for about 15 years. Each plant will yield on an average from 2½ to 3 lbs. of fibre. The leaves may be gathered throughout the year, 20 to 25 being cut every 90 days. The plant requires but little attention. After the land has been cleared, the young plants are placed 6½ by 6½ feet apart each way, which allows of 1,000 to be planted to the acre. The plant is said to thrive best in a sandy and rocky environment.

The average yield mentioned in the U.S. Consular Report—40 to 48 oz. per plant—gives the average yield per leaf at about or under half-an-ounce. This seems low as compared with the Sisal plant as grown in India, where (*see* Agricult. Ledger, 1900, No. 6, p. 62) it has been found that 2 to 2½ oz. of fibre may be obtained from a single leaf. In this case the proportion of fibre to leaf was from 4¾ to 5½ per cent. This proportion was probably unusually high; in other cases the ratio of fibre to leaf has worked out at 3 to 3¼ per cent. The data supplied as regards Zapupe are insufficient to admit of exact comparison with Sisal, and more precise figures than have yet been given are desirable.

In collecting the leaves the labourers use a long-bladed knife with a sharp hook-like curve at the end, which is introduced between the stump and the leaf, and with a dexterous upward jerk the leaf is severed close to the stump. This is essential as an uneven, ragged stump will deteriorate and often die. The leaves are then made into bundles of 50, the needle-like points being cut off before they are taken to the cleaning shed for the extraction of the fibre. When properly extracted the fibre is described as being white, strong and flexible, and rope made from it is said neither to kink nor to mildew when exposed to dampness or when immersed in water.

In an article on the subject which appeared in the "Guadalajara Gazette" of March 25th last, it is stated that the principal proprietors of Tantoyucan in Vera Cruz have formed a company, with a capital of $100,000, to export the Huasteca fibre called Zapupe or Huasteca Henequen.

The excellent results obtained by the agriculturists of Tamaulipas and Coahuila from this plant have decided the people of Tantoyucan to follow their example. The shares of the new company have already been sold up to $40,000.

Recently living Zapupe bulbils have been received at the Royal Gardens, through the Foreign Office, from H.M. Vice-Consul at Tuxpam. These are too small at present to admit of the determination of the species, but they suffice to show that Zapupe is a species of *Agave*. Efforts are being made to obtain further specimens of the plant and samples of the fibre for the Museum.

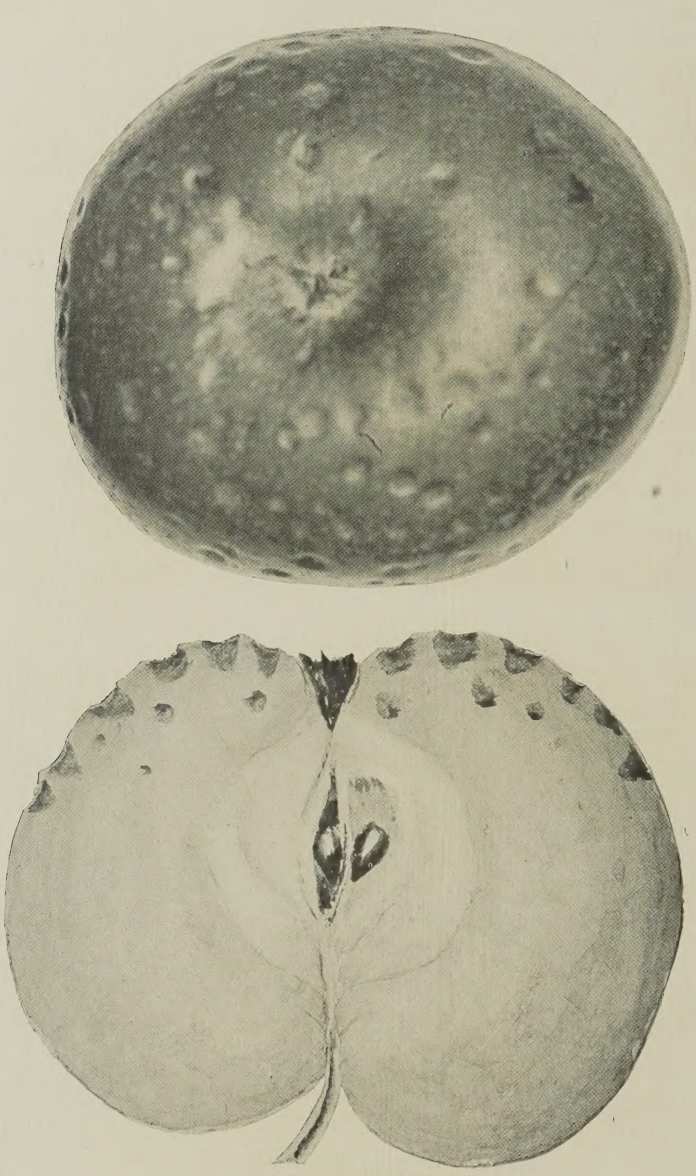
Bambarra Ground Nut.—The publication of the note on *Voandzeia subterranea*, Thou., at p. 68 of this volume has led to the communication by Dr. M. Greshoff to Mr. Burkill of the following interesting supplementary note :—

" In Western Java the beans are also eaten by the native, and known to them under the name Katjang bogor (Buitenzorg Beans), doubtless because the plant was introduced by the Botanic Gardens at Buitenzorg. In the Laboratory of the Colonial Museum at Haarlem (v. Bull. No. 26, 1901), we found this composition for the Java *Voandzeia* :—

Water	12·78
Oil	6·41
Nitrogenous matter	19·12
Starch	49·28
Cellulose	5·79
Ash	3·33

" You see that the analysis does not differ very much from the analysis found by Thoms and by Balland."

Index Florae Sinensis.—A few copies of Nos. 1 to 10 and of Nos. 14, 17, 19, and 20 are still available for the use of those whose sets of the *Index* are incomplete. Librarians desirous of obtaining copies of these numbers are invited to make their wants known to the Keeper of the Herbarium.



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